OCCUPATIONS

The
Vocational Guidance Magazine

VOLUME 12 NUMBER 10

JUNE, 1934

ANALYSIS OF OCCUPATIONS

A Symposium Edited by
MORRIS S. VITELES

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OCCUPATIONS

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Vocational Guidance Magazine

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OCCUPATIONS
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ANALYSIS OF OCCUPATIONS

Editorial Foreword

MORRIS S. VITELES

IN THE wise choice of a vocation, wrote Frank Parsons in his classic text, *Choosing a Vocation,* "there are three broad factors: (1) a clear understanding of yourself, your aptitudes, interests, ambitions, resources, limitations and causes; (2) a knowledge of the requirements and conditions of success, advantages and disadvantages, compensation, opportunities, and prospects in different lines of work; (3) true reasoning on the relation of those two groups of facts." [1]

These still remain the factors which the counselor must bear in mind in giving vocational guidance. He must have a clear understanding of *the individual*—his abilities, interests, health, education, work history, social background, etc. At the same time he must have a knowledge of the requirements and conditions of success in different *occupations.* He should be able to give the individual specific information on the duties of each, the machines used, conditions of work, pay, necessary training, employment conditions, opportunities, and on the broad sources of satisfaction and dissatisfaction which characterize the occupation. Finally, his recommendations should be made only after a careful comparison of the individual's capacities, skills, inclinations, temperamental and allied characteristics with those demanded by various occupations.

The progress which has been made in the analysis of the individual—in the measurement of aptitudes, interests, temperamental characteristics—and the problems of individual analysis are discussed in the symposium edited by Donald G. Paterson, appearing in the April, 1934, number of *Occupations, the Vocational Guidance Magazine.* In the present companion issue are recorded what has been accomplished in the *analysis of occupations,* the difficulties which have been experienced and the many problems which remain to be faced.

II

As in every symposium of this kind, the content is distinguished by diversity rather than by uniformity. This naturally follows from the attempt to introduce into it descriptions of the different techniques and viewpoints which characterize work in this field. There is a wide

[1] Parsons, Frank. *Choosing a Vocation.* Boston, Houghton Mifflin Co., 1909, p. 5.

gap, for example, between the viewpoint, expressed in the article by Douglas Fryer and E. J. Sparling, that with the exception of a tryout in the occupation, intelligence level is the best single predictive index of occupational success, and Franziska Baumgarten's emphasis upon adaptability to the social interrelations of the job as an extremely significant and neglected element in vocational adjustment. And still, through this diversity of viewpoints run certain common threads of agreement. It may be well to point these out, if only to counterbalance the feeling of hopelessness often awakened by striking contrasts and disagreements in a field of activity where uniformity and integration are sadly needed for the attainment of practical objectives. They are:—

1. A healthy recognition that, although progress has been made, much remains to be done in providing adequate studies of single occupations and in occupational classification.

2. A pronounced feeling of dissatisfaction with the *subjective methods* that have been employed in occupational analysis and a corresponding interest in *objective techniques*.

3. The repeated expression of the need for *standardization of terminology* to permit a more ready comparison of independent studies and a more complete standardization of techniques.

4. A recognition that satisfactory analysis can only be achieved by direct study of industrial processes and conditions by trained observers.

5. The opinion that in the past the analysis of qualifications has been too largely limited to intellectual qualities and that this must be supplemented by a greater concern for non-intellectual traits.

6. Finally, the emphasis on a *dynamic orientation* in occupational analysis. This is reflected in the repeated reminder that counselors are interested not only in the *present status* of an occupation but also in its *changing aspects*. The study of occupational trends is shown to be an essential feature of comprehensive job analysis and occupational classification.

So much for generalizations which may be drawn from the articles appearing in this symposium. For the rest, the contributors may speak for themselves! The "guest editor" has made little use of editorial prerogatives in preparing the manuscripts for the press. However, a few words about the organization of material, to show its direction, may be in place.

III

It seems logical to place in the first position the article by Cleo Murtland describing the activities and outlook of the Occupational Research Section of the National Vocational Guidance Association. This is the organization which has been perhaps most actively interested in the preparation of occupational studies for direct use by vocational counselors and those seeking guidance. Professor Murtland's statement of what this organization has been trying to do in its ten years of occupational research sets up a background for the consideration of specific techniques and accomplishments presented in other contributions.

The article by C. A. Koepke, which follows, is presented as describing the most comprehensive attempt at occupational classification in one area which has so far been reported. Here are described not only new findings and new methods, but a challenging philosophy with respect to techniques and to their immediate significance for vocational and educational adjustment that merits close consideration by the reader. Even where the latter will object to what may perhaps be

described as slightly dogmatic and premature conclusions, he will be stirred by their challenging character.

These two general articles are followed by a series dealing primarily with specific methods in occupational analysis. *Time and motion study* techniques, described in Lillian M. Gilbreth's contribution, should be known to the counselor, and more particularly to those active in occupational research, even though they may have a more limited application in vocational guidance than that possessed by other methods.

The *nature and analysis of skill* present important problems in occupational study. Mildred Fairchild presents a new technique for skill analysis in standard terms that has proved useful in making a direct comparison of skill required in diverse occupations.

In the *job psychographic method,* described by J. L. Otis and K. R. Smith, is found an attempt to replace the vague, undefined terminology of traditional studies by standard descriptive terms and a systematic rating of the importance of particular traits. Many will doubtless find objectionable the use of "artifacts," in the form of "mental abilities," and the ever present factor of subjective judgment in rating the extent to which each of these is necessary for success on particular jobs.

Classification of occupations by intelligence has been a helpful aid to the vocational counselor. Even those who may disagree with the importance ascribed to intelligence in occupational success by Douglas Fryer and E. G. Sparling will be impressed with the explanation of methodology and the wealth of data presented in their article.

Among the earliest methods of job analysis is that involving the use of *questionaires.* First used in 1916 by Lipmann,[2] it has since been applied by various investigators as an aid in occupational classification. It is significant to find it appearing again in the work of English investigators who find that, in spite of very definite limitations, the questionaire method is of value, particularly when supplemented by interviews. The article by M. B. Stott and M. Birkinshaw has interest not only because of the discussion of this technique in occupational analysis, but also because it discusses recent work on occupational analysis carried on in Great Britain under the auspices of the National Institute of Industrial Psychology.

Students of occupational research recognize that the problems of analysis in individual plants are somewhat different from those arising where application in vocational guidance is the chief objective. The methods that are particularly adaptable to industry and what the results of job analysis offer to the vocational counselor are discussed by R. S. Uhrbrock, of the Procter and Gamble Company. And, in passing, he offers excellent advice to those who might be tempted—as many have been—to practice occupational research without an adequate background of training and experience in the industrial situation.

The article by W. W. Charters demonstrates that there *are* vocational schools and experts in the field of vocational education with a full appreciation of the need of occupational studies within their areas of influence as a basis for establishing educational policy and curricula. This article on the survey conducted by the Rochester Mechanics Institute will gladden the hearts of those who believe that vocational education need not be ten or

[2] O. Lipmann. "Zur psychologischen Charakteristik der 'mittleren' Berufe," *Z. f. ang. Psych.,* 12 (1916), pp. 99-107.

more years behind the times.

Dr. Baumgarten, of the University of Bern, was asked to prepare an article on recent developments in job analysis in continental Europe. Instead of presenting a description of specific studies, she has seen fit to develop a discussion of the philosophy underlying job analysis and of newer outlooks which are guiding European workers in this field. As a result, her article contains a number of critical concepts and suggestions which bring into focus certain important needs of occupational research that have doubtless been neglected in the past.

IV

And with this we come to the end of the symposium. It is incomplete in certain respects. The occupational ability patterns of Trabue, the weighted formulae discussed by Hull in the special issue on Analysis of the Individual, are really methods of *stating* as well as of *testing* qualifications for particular forms of work. However, since these are discussed in that issue, they have been omitted from this symposium.

Regardless of the method employed in occupational analysis, its practical value is limited unless its results are integrated with techniques employed in the analysis of individuals. In practice, the vocational counselor hopes one day to be in the position of the chemist in testing a material product. The latter, having consulted the specifications—stated in objective terms—proceeds to analyze the material in an orderly fashion to determine how well the product fills the specifications. So in counseling, given the requirements of a job, it should be possible to determine quantitatively how well the individual meets these requirements. Unfortunately, or perhaps the critics of this material age will say, fortunately, such a program still seems to be only a dream of the distant future.

THE MEANING OF PRODUCTIVE EDUCATION

A productive education is thus defined by M. L. Altstetter, State Teachers College, Fredericksburg, Virginia, in the *Peabody Journal of Education:* "It means not simply knowledge, but increasing knowledge; it means habits and skills which function; it means appreciations, attitudes, and ideals which result in nobler living. It means that society and its wealth are not only to be perpetuated, but also to be constantly recreated; something new, better, and nobler is to be achieved. Opportunity is therefore extended to each pupil to express himself through line and color, constructive materials, words and sentences, music, games, experimentation, and exploration in the hope that he may some time produce something better. Adjustment is to be made to new and strange situations whether social, vocational, or physical, at work or during leisure time."

OCCUPATIONAL STUDIES

CLEO MURTLAND

AS THE vocational guidance movement turns its twenty-fifth year, occupational research approaches full stature. The early studies by Frederick J. Allen, largely the product of one man's faith in the value of occupational information and the need for it, paved the way for contributions to occupational information in the years that followed. The *Survey of Occupational Studies* made by May Rogers Lane in 1927, and brought up to date in 1931, shows the extent of occupational research in two decades. Her analysis of content and use of studies indicates their value to guidance workers.

The Occupational Research Section of the National Vocational Guidance Association has fostered this work actively for the past ten years, and in the last four years has set about the task of making occupational information, hitherto quite local in scope, applicable throughout the country to the occupations studied. It now seems safe to say that occupational research has gone through the experimental stage. The information garnered has much value and many uses. Henceforth, in addition to finding a way to increase the distribution of studies, attention must be given to making them generally applicable.[1] The collection and dissemination service of the *National Occupational Conference* promises a much more widespread coordination of these activities than can be accomplished by volunteer individual effort.

II
TYPES OF OCCUPATIONAL RESEARCH

Occupational research is carried on, in the main, in two ways and with two objectives. Studies made under the immediate direction of vocational bureaus and guidance departments of the school and by vocational guidance students in college courses represent one type. Those made by economists and statisticians for such organizations as the Personnel Research Federation, the National Industrial Council, corporations, and other organizations represent the second type. Other studies made by individuals on their own initiative may or may not be sponsored by these or similar organizations.

Research carried on as one of the major activities of the vocational bureau, as in Cincinnati, Chicago, New Orleans, Milwaukee, and other cities, is dominated by a sense of responsibility for individuals anticipating and preparing for occupations in which they expect to be employed either in the immediate future or upon completion of the school course they are pursuing. Studies made for this purpose feature descriptive and explanatory data and information about working conditions, hours, and opportunities for employment. Statistics, except to indicate the numbers employed at various

[1] One study, *The Printing Trades and Their Workers*, by Florence Clark, has been published.

levels, constitute a relatively small part of these studies. College students in training for counseling, placement, and occupational research also make investigations and prepare studies, some of which are of use in classroom, counseling, and placement activities.

Reports prepared by the Personnel Research Federation, the National Industrial Council, and by many large business organizations as annual surveys or as part of their regular routine are concerned with the more comprehensive problems of employment trends, wage fluctuations, the rise and fall of business from detailed records. In many instances these studies include a detailed type of job analysis seldom used in occupational studies prepared for school and placement use. Studies such as these are dominated by a desire to gather the comprehensive information required by managers and personnel workers and the information they contain seldom comes to the attention of the rank and file of workers most affected by the conditions the findings reveal.

This brief article is concerned mainly with the first type of occupational study mentioned because this claimed the attention of the Occupational Research Section of the National Vocational Guidance Association in the years when the need for a wider range and more explicit type of occupational information for use in the schools was most urgent. The centers cited are those whose activities have been followed by members of the Occupational Research Section for some years. An all-inclusive study would probably reveal few additional practices. Bibliographies of studies issued in mimeographed form, as the one recently issued by the Cincinnati Vocational Guidance Association, the annotated bibliographies prepared by Willard E. Parker for the University of Michigan and NOC, and still other bibliographies, suggest the range and content of studies.

III
RESEARCH IN VOCATIONAL BUREAUS

Research conducted by vocational bureaus for use in vocational guidance work in the immediate community has two distinct phases. The first of these is day-to-day study of working conditions, fluctuations in wages, labor demands, changes in policy, and similar items which become a closely knit part of the information used by research workers and counselors in the daily routine of counseling and interviewing. This quest is a continuous and most essential part of an effective vocational guidance program. The Chicago Vocational Bureau, the Cincinnati Vocation Bureau, the Minneapolis Bureau, and others have maintained this type of occupational study on a high plane for a number of years. Materials from these sources have supplied teachers and counselors with up-to-date information. Revision of occupational information at regular intervals has also been carried on as an established procedure.

The second type of research carried on by these bureaus is preparation of occupational information for single occupations and for fields of work which involve a number of occupations. In some bureaus investigations are made by trained research workers and the studies are put into text form under competent direction. In others, studies are made by counselors and teachers under the direction of a staff member who also serves as editor.

Studies, in the main, are prepared in two forms: first, as detailed information for use by counselors and teachers (often in mimeographed form and sometimes in

printed pamphlets); second, in simplified text, frequently illustrated, for use by pupils. Vocational bureaus in Chicago, Cincinnati, Milwaukee, Minneapolis, New Orleans, and other cities have contributed extensively to occupational information in this form and to information about the schools in which the occupations are taught.

Many counselors and teachers have been trained to use the information in the city schools for which these studies were prepared and much attention has been devoted to the development of such research techniques as finding additional information, checking statements for their validity, timeliness of data, and examining of sources. In this fashion teachers, counselors, and pupils are taught to make occupational study a quest and not merely a stint to be completed and set aside.

IV
COLLEGE OCCUPATIONAL RESEARCH

Many studies developed in research courses in colleges are made by teachers, counselors, and administrators preparing for work of this kind in the school systems. Some colleges maintain a staff of trained research workers who cooperate in this form of research with local school systems, and, in some instances, with an entire state. For some years, the University of California, operating under the latter plan, has carried on a continuous program of investigation and preparation of studies for distribution to all centers in the state. Teachers College of Columbia University includes even wider areas.

In recent years colleges in which trainees have been pursuing occupational research have attempted to establish connections with local communities for the purpose of (a) promoting the use of studies made under their direction in connection with an established program, (b) aiding in the development of guidance plans which must be built up gradually, and (c) providing qualified workers for these enterprises.

A recent development in this connection is the preparation of a number of occupational studies in source book form by a group of teachers and counselors in Pontiac. These studies, made under the direction of the University of Michigan, were placed in the school libraries for reference use in the junior and senior high schools of that city.

V
DEVELOPMENT OF STANDARDS AND TECHNIQUES

The development of reliable standards and techniques has received much attention in the past decade. May Rogers Lane, in *Occupational Studies*,[2] brought together, analyzed, and classified surveys and studies and presented a method to guide the beginner in systematizing investigations and in the preparation of studies. *A Schedule and Instructions for Investigation*,[3] and *Content and Arrangement of the Schedule for Occupational Investigation*,[4] by Florence E. Clark, *Problems of Summarizing and Editing Occupational Studies*,[5] by Mary Corre, and similar articles also directed to this end have been widely used.

The adoption by the National Vocational Guidance Association of a basic outline, now used extensively, assures

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[2] Published in monograph form by the International Textbook Company, 1927, 81 pp.

[3] *Vocational Guidance Magazine*, VI, pp. 9-24 (October, 1927).

[4] *Vocational Guidance Magazine*, IV, pp. 318-325 (April, 1926).

[5] *Vocational Guidance Magazine*, IV, pp. 334-340 (April, 1926).

content and focuses attention upon consistent and accurate—though not necessarily uniform—presentation of data. The task of making occupational information definite, authoritative, adequate, and interesting, demands not only a technique that precludes reliance upon opinion, but also a high regard for unbiased statement and the ability to make the text reveal these qualities to the reader. Occupational studies may be prepared in many forms but authenticity of data is a basic and essential element of every study. Authenticity has not necessarily been established by the first information secured. Sources that may contradict or confirm must be examined before information is presented as factual data. That occupational study without such scrutiny is not research and occupational information prepared without such care is of no real value have been made the creed of workers in this field.

An active campaign against published texts and articles freighted with "occupational misinformation,"[8] as it was designated by Mary Corre in a study of texts and bulletins in 1932, has been an important item in the effort to establish reliable standards in occupational research. The practice of countenancing the use of obsolete and inaccurate information and unacknowledged excerpts not only discredits the authors who use them but tends as well to lower the tone of occupational information. The Vocational Guidance Association has called the attention of publishers to these practices and urged that manuscripts be edited by persons qualified in this field. To date fourteen publishers have agreed to submit manuscripts for examination before publication.

[8] Unpublished article by Mary Corre presented at National Vocational Guidance Convention in Washington, 1932.

VI
STUDIES AND THEIR USE

The problem of determining occupations and fields of work to be investigated has become increasingly important. Studies which emphasized varying local conditions and specific demands upon workers due to local practices are being replaced by studies which include regulations and practices more generally applicable. What may be called the *vertical treatment of occupations*—that is the study of an occupation with its early background, its development, and present practices in sequential order—fosters the localized study because the variable items which limit its use to one community seem to present an insurmountable problem in the preparation of studies. This procedure has not only curtailed publication but has limited the distribution of many valuable studies.

The first step in widening the scope of studies and reducing the concentration of occupational research to a few fields began in a modest way by attempting to coordinate studies carried on simultaneously in two or more centers by exchange and comparison of data. While the amount of work done this way has been limited, it opens wide opportunities for development in dealing with items that are pertinent to all studies. The codes of the National Industrial Recovery Act have already given impetus to the horizontal study of single items which lend themselves to this procedure. Occupational skills and practices viewed in like manner also should help to determine trends in the standardization of an occupation and the significance of varying practices. The plan of using questions and problems for investigation in connection with studies suggests a method of employing texts and searching for current information which teachers, coun-

selors, and pupils may apply in localizing information. *The Printing Trades and Their Workers,* by Florence E. Clark, published in 1932 as the first of a series of studies for use throughout the country, is a recognition of the wide applicability of occupational information in one great industry. Other studies of this type are to be made.

The use of occupational studies has lagged behind the progress made in the preparation of occupational information. Reliable occupational information texts are filling a need in the junior high school but the more specific aspects of occupational practices too seldom receive the attention their importance merits. While this is due in part to the lack of available printed matter and difficulties in the distribution of studies, it is also due to the tendency to emphasize educational information at the expense of vocational information. Because the problems of adjustment loom large in the secondary schools educational information tends to occupy the attention of teachers and counselors, and many administrators and teachers frankly oppose vocational information on the ground that it interferes with the traditional program.

In order to increase the quantity and distribution of occupational studies and to insure adequate use of them, teachers and counselors must not only be taught how to use occupational information but trained to make investigations and prepare data in various forms for use. This points distinctly to greater provision for training in colleges, particularly for communities which cannot support a separate bureau, and for field work which ties up with school systems and business and industrial life. No amount of reading will take the place of field work, checking data to establish its authenticity, and analyzing the duties, skills, and responsibilities involved in an occupation.

Harvard, Columbia Teachers College, the Universities of Michigan, California, Wisconsin, Rutgers, and many other institutions have carried on occupational research activities for a number of years. Though their main objective is training counselors and research workers for schools, vocational bureaus, and personnel departments, these colleges also publish occupational studies. Colleges and public school systems should cooperate more closely in this work for several reasons. More studies could be carried on simultaneously. Occupations for which there is no information available could be included without withdrawing attention from those for which there is constant demand. The system of continuous study and revision could be carried on with little extra labor. A reviewing or editorial committee of experienced research workers could be developed to work with those in charge of courses and school activities. This service has begun in a small way in the Occupational Research Section of the National Vocational Guidance Association.

The great changes in occupational activities of all kinds in the past few years have created a need for occupational information in every field and every location far beyond the requirements of the past. *Horizontal study of occupations* on a given level in many fields is an immediate need for the transfer of workers to new employments in which their skills and knowledge can be utilized. Not only is the mature person, faced with the necessity of changing his employment, experiencing real need for reliable information in order to make this transfer, but realignment of occupations in which young people may expect to get a start in life is also creating new problems for

those just under adult age. The absorptive possibilities of occupations, to which attention has been directed by Bingham and Clark, must be determined in predicting how workers are to be distributed in years to come. Mere guesswork, as Bingham points out, will not suffice.[7]

[The Occupational Research Section of the National Vocational Guidance Association is beginning immediately a study, on a nation-wide scale, of store occupations in rural and urban communities. The Carnegie Corporation has recently made a grant for this purpose. In addition to the development of occupational research techniques, this study will attempt to contribute constructively to some of the major needs which present social and economic conditions have brought to light and add measurably to the usefulness of occupational information in a field of vocational activity that touches every community in the country. This represents a courageous but a very essential venture in occupational research.]

[7] For an elaboration of this discussion of occupational trends, the reader is referred to the February, 1934, number of *Occupations*, which carries a symposium on "Occupational Distributions and Trends," edited by W. V. Bingham and H. F. Clark.

APPENDIX

Current Studies

Although enforced economies of the past year have reduced the number of studies in many quarters, many are in process at the present time. Some of these reflect new influences. Among those in process of preparation are the following:—

University of California

- Architect
- Chemist—Chemical Engineer
- Gas Station Employes
- Occupational Opportunities Related to Science, Mathematics, Social Sciences, Foreign Languages, Art, Music, Writing, Physical Education, Cooking, Waiter and Waitress, Housework
- Occupational Opportunities for Negroes
- Policeman
- Reporter—Newspaper Work
- Sign Painter—Show Card Writer, Silk Screen Artist
- Woodworking Industry

Teachers College, Columbia University

- A Personnel Study of the Profession of Advertising, in Cooperation with the Federation of Advertising Clubs of the World
- A Personnel Study of Women Journalists

Milwaukee Vocational School, as CWA Projects

- A Study of Occupational Trends for a Quotation on 125 Different Occupations Every Three Months
- Guidance and Placement Information by Means of Graphs, Charts, and Diagrams
- Apprenticeship since 1916
- Domestic Service

Pittsburgh

- Continuous Study of Unemployment through the Schools Related to Family Aid
- Counselor's Handbook (Completed)
- Guidance Clinic—Proposal Now Under Consideration

Minneapolis

- Unemployment Among Recent High School Graduates

Detroit

- The Junior Male Worker and the National Recovery Act in Detroit
- Problems in the Guidance and Placement of Negroes

University of Michigan

- Trends in the Employment of Youth in the Past Five Years

A JOB ANALYSIS SURVEY

Its Procedures and Some of Its Results

C. A. KOEPKE

PART I

Procedures as Followed by the Employment Stabilization Research Institute of the University of Minnesota

JOB ANALYSIS has been discussed for a number of years by psychologists, educators, and industrial engineers, but, like the weather, nothing in particular has been done about it. Individual plants have made job analyses of their own operations, but persons outside a specific business have not yet attempted to survey an entire industry or, more important, several industries. Moreover, since the bases or plans by which the data for the various small studies have been obtained were not the same, it has not been possible to correlate their information.

In 1931, at the University of Minnesota, an institute was set up for the purpose of studying in complete detail industrial conditions in Minnesota and their effects on employment. This institute, the full name of which is the Employment Stabilization Research Institute, very soon fixed upon the idea of making a job analysis study of factories in Minnesota, particularly those in Minneapolis and St. Paul. This analysis was to record actual factory conditions directly and impartially.

Under the direction of the writer a staff for making the study was chosen that consisted of from 10 to 14 graduates of the department of mechanical engineering. All of these men had been trained in factory procedures. This fact can hardly be overemphasized, for only through their knowledge of factory situations and machinery could they collect and interpret the data properly. The form that was devised and used for gathering information is shown in Figures 1 and 2.

The data, it will be seen, were recorded under four main heads or classifications: (1) *identification of the operation;* (2) *the worker;* (3) *the work;* and (4) *the machine.* At first glance this division of material may seem illogical. The first and fourth sections are concerned with the mechanical aspects or processes of the factory, whereas the second and third apparently have to do only with the worker as a human being. The explanation is that whatever interest or curiosity the staff may have had for the workers in themselves, for the purposes of the survey their point of view was defined by the mechanical operations. In other words, it was not what the worker could do (or was) that was significant; it was the demands and requirements of his particular job or operation. Personal information was important only in so far as it gave a more complete history of the operation. This point of view is explained more fully in the second section of this article under the topic, *Classification of the Worker.*

Out of almost 100 firms that were asked to cooperate in the project, only

Figure 1

EMPLOYMENT STABILIZATION RESEARCH INSTITUTE

UNIVERSITY OF MINNESOTA

OPERATION SHEET FOR JOB ANALYSIS

Identification of the Operation

Firm No.....

Part Name .....Part No.....Number of Op. on this part.....

Operation No.....Operation Name.....

Description of work done during operation (see over for pictorial representation).....

.....

.....

.....

.....

.....

.....

THE WORKER

Actually from Worker on this Operation

1. Sex—M ☐ F ☐ 2.* Age—Use code.....
3.* Actual disabilities .....
4. Major previous occupations, length of service, and where .....
5. Length of service on this operation.....

Characteristics of Worker on this Operation

1. Age limits for hiring—Under 30 ☐ 30 to 45 ☐ Over 45 ☐
2. Special requirements—Smell ☐ Taste ☐ Clerical ☐ Hearing ☐ Touch ☐ Ambidextrous ☐ Left Hand ☐
3. Tools worker should own.....Kit ☐ toolmakers, carpenters, etc.
   Incidental tools ☐ None ☐
4. Training time necessary to work undirected on this operation .....
5.* How is training received (use code)?.....
6. What other operations has this operator performed satisfactorily in this plant?.....
7.* Classification of worker—A ☐ B ☐ C ☐ D ☐ E ☐
8. Calculate on job—Yes ☐ No ☐ If so specify type of calculation .....

THE WORK

1. Weight—100 lbs. and up ☐ 10 lbs. to 100 lbs. ☐ 1 lb. to 10 lbs. ☐ 1 oz. to 1 lb. ☐
2. Strength needed most—Back ☐ Legs ☐ Arms and hands ☐
3. Dexterity—Finger ☐ Hand ☐ Arm ☐ Foot ☐
4. Position—Stand ☐ Sit ☐ Stoop ☐ Reach ☐ Walk ☐
5. Transportation of material } to operation ..... from operation .....
6.* Machine set-up—Complicated ☐ Simple ☐ Done by others ☐
7. Accuracy—Gage or mike ☐ Scale or rule ☐ None ☐
8. Does operation require reading of blue prints? Yes ☐ No ☐
9. Working conditions—Good ☐ Hot ☐ Cold ☐ Humid ☐ Fumes ☐ Dusty ☐ Dirty ☐ Oils ☐ Acids ☐ Poor ventilation ☐
10. Location of job—Inside ☐ Outside ☐
11. Sanitation—Common drinking cup ☐ St. jet ☐ An. jet ☐ Dirty fountain ☐ Individual toilets ☐ Trough toilets ☐ Dirty toilets ☐
12. Lighting (ft. candles)—Natural.....Artificial.....
13. Hazards and safety precautions.....
14. No. of pieces, lbs., etc., per hour (av. from time on 10 units "as *is*").....
15. Method of pay—D.W. ☐ P.W. ☐ Premium ☐ Std. T. ☐ Group ☐
16. Are time studies used to set rates? Yes ☐ No ☐
17. Team work ☐ Individual work ☐ Paced ☐ Set own pace ☐
18. Normal number of hours per week.....
19. Rate of pay translated to 44-hour week $.....
20. No. of men on this op.....No. of pieces per unit.....
21. Type of fixture used.....
22. Material used .....
23. Cutting tool material.....F.P.M.....
24. Average production per 8 hrs. in normal times.....
25. Ultimate product .....

The Machine on this Operation

1. Type of machine, name and size.....General purpose ☐ Special purpose ☐
2. Automaticity of machine—Strictly automatic ☐ Tools preset, but manually operated ☐ Strictly manual ☐
3.* Age of machine (use code).....Condition of machine—Excellent ☐ Good ☐ Poor ☐
4. Remarks .....

.....

Observer.....

Name in full

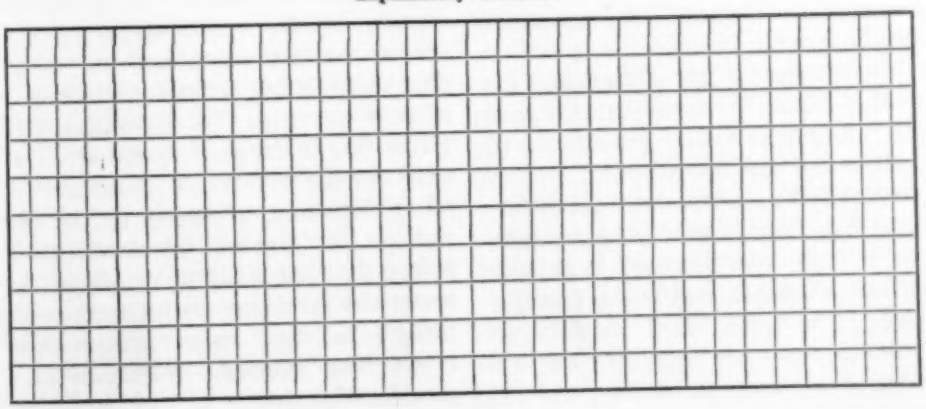
Figure 2

EXPLANATORY DATA

Photographs of Part After Operation

Photographs of Fixtures Used

Explanatory Sketches



DEFINITIONS

Code for Training Received

0. No training
1. Instruction by foreman
2. Working with experienced operator
3. Special training instruction
4. Vestibule school
5. Vocational school
6. Apprenticeship
7. High school
8. College
9.

Machine Set-up

Check type of set-up and whether done by others:

Actual Disability

Loss of arm, hand, fingers, speech, sight, hearing, leg, foot.

Code for Age of Machines

0. Less than 1 year
1. 1 to 3 years
2. 4 to 9 years
3. 10 to 15 years
4. 16 to 21 years
5. Over 21 years

Code for Employe's Age

0. 10-17
1. 18-19
2. 20-24
3. 25-34
4. 35-44
5. 45-54
6. 55-64
7. 65-74
8. 75-over

two withheld permission and one of these later capitulated. In the end 88 firms representing 33 industries were surveyed. Not all of the plants that were available were studied. To save time and effort, a selection of plants in any one industry was made in so far as it was possible, on the basis of representativeness. The hand-operated plants, for example, were set up against the mechanized plants in an industry, the large plants against the small plants, the plants located in large towns against those located in small towns.

The selective process was carried even further. In the baking industry, mechanized plants were chosen on the basis of their specialty, pie, bread, cake, crackers, and macaroni. In some industries the complete sequence of the manufacturing process was examined—the dairy industry, for instance, where the operations ranged from milking to butter packing. A selection of this kind permitted the greatest possible opportunity for comparison and evaluation of the several job analysis factors.

Identification of the Operation. The heading "Firm No." kept secret the name of the firm, thus making possible the cooperation of the industry and insuring freedom in the discussion and use of findings. The "Part Name" (and part number, if any) told what article or what part of an article was being manufactured. The word "part" in this connection has two meanings: (1) *the completed article ready for market,* and (2) *any one of the units manufactured separately, that made up the finished product.* The assembling of the units, or of the completed parts, as well as the manufacturing of those parts, may be counted as one or more operations. We see, therefore, that usually a number of operations would have to be recorded to account for a finished "part."

The exact number of operations needed to complete the part and the operation number were used to make an orderly sequence in the production flow sheet and also to facilitate the detection of missing operation sheets. The name and description of the operation told exactly what was done and how.

In order to get a complete description of each operation, the staff photographed or made sketches—sometimes both—of the various stages of the operation. They photographed or made sketches of the part before and after each operation was performed on it and also of the machinery, tools, or any special equipment used for the operation. From these pictures and sketches they should be able, even after a lapse of years, to recall minute details of the various manufacturing procedures.

All data were obtained from operations actually in process. As it was difficult offhand to estimate the productive capacity of the various types of machines, the staff made a short "as is" time study (using decimal stop-watches) of each operation. No allowances were given, that is, fatigue or comfort allowances for the workers, or allowances for oiling, repairing, or setting up the machinery, etc. Nor was any attempt made before the time study to reorganize the operations for better performance, even though in many cases reorganization might have increased production to a considerable extent.

The Worker. The age and sex of each worker were obtained in order to discover whether or not there was a child labor problem in Minnesota and also whether or not the ages of the factory workers were confined within any definite limits. The recording of disabilities indicated on what jobs, if any, manufacturers were

willing to use physically handicapped persons. Age limits for hiring were checked because full data on this topic would ascertain what policy existed in industry toward hiring older workers. The discovery of whether or not an industry was demanding any special aptitudes or sensory refinements from its workers was believed to be valuable, as was the knowledge of the extent to which workers were now required to own the tools they use. According to general technical opinion, the average worker has been divorced from the tools of production. Whether or not the average worker must calculate on the job is important from the standpoint of vocational training.

The time necessary to train a worker to perform a task satisfactorily and the manner in which that training is received are obviously matters of great significance not only to the worker himself, but to industrial management, and to vocational schools. Directly connected with these topics is that of the mobility of the worker or the major previous occupations in which he has been engaged. In this survey the number of operations performed satisfactorily by the worker within any one plant was noted also, to measure the extent of mobility within plants. The "length of service" in a plant gives an idea of that plant's ability or willingness to allow its workers to grow old on the job. The classification of the worker, that is, the classification of the skill demanded by the operations, is the final item in this section. That the data obtained on these topics reveal tendencies of startling consequence is shown in the second part of this article.

The Work. The first four topics under the heading "The Work" consider the various causes of fatigue in factory labor and their importance is clear without further explanation. During the last two decades the methods of transporting material within plants have been revolutionized; data on this topic revealed to what extent the newer methods are being utilized in the factories of Minnesota. "Machine Set-Ups," "Accuracy," and "Blue Prints" are among the factors that determine into what class (skilled, semi-skilled, and unskilled) present-day factory workers fall. The data obtained on these questions have also been considered in the second part of this article.

The importance to the health and welfare of the worker of working conditions, of the physical location of his job, of sanitation, of lighting, and of safety precautions is obvious and need not be explained. From a slightly different angle the method of pay and time studies, the method of working, and the length of the working week also bear on the welfare of the worker. They have pertinence to a still larger question, however —that of security in general. Factory production and, through factory production, large portions of the population may be beneficially or adversely affected if the conditions underlying these factors are subjected to drastic changes. The question of cutting tool materials should be included in any job analysis survey because the kind of material used indicates to a large extent the possible rate of production in a given factory. In the industries of Minnesota, however, there is little occasion for the use of cutting-tool materials and the data obtained on the topic were not of much import.

The Machine. The type of machinery used in a factory largely determines the character of the operations. It is one thing to drill a series of holes with an ordinary single drill and quite another thing to drill all the holes in a piece at the same time with a multiple spindle drill press. The extent to which general

purpose and special purpose machinery is used gives evidence of a factory's elasticity or degree of specialization. The automaticity of a machine helps to determine the degree of skill required from its operator. The last two topics, the age and condition of the machine, together constitute a valuable criterion of the usefulness of a particular piece of machinery.

In a bulletin published for the Employment Stabilization Research Institute by the University of Minnesota Press, the findings of the job analysis survey are recorded in full. In the space allowed here only a few of the subjects can be discussed. Since some indication of the reason for including each particular item has been given, however, it may be possible to gauge the scope and general plan of the survey and other research workers may find it helpful in making job analyses to use the general outline given on the operation sheet.

If funds are available the writer hopes after some years to make a second survey that will cover the same factories as the first. By means of the "Identification of the Operation" he will be able to return to exactly those operations that have now been studied. Moreover, the fourth section (The Machine) and certain topics that were not mentioned in the third section (The Work) constitute a basic plan of measurement of future technological changes. In other words, this survey is an entering wedge in a scientific study of technological conditions.

PART II

Some Findings of the Job Analysis Survey

Training the Worker. What training a worker must have to be able to work undirected, the length of time that training requires, and in what manner and by whom it is best acquired must be known to production workers, to factory owners, and to vocational schools before they can make the best use of their time and energy. The division of a great many industrial operations into small units has not only caused a drastic shortening in the time necessary to train a worker; it has also caused far-reaching changes in the qualifications a worker must have for a factory job.

Of all the operations surveyed *22 per cent required a training time of less than one-half a month for their satisfactory performance; 33 per cent required from one-half to two months; 17 per cent from three to nine months; 16 per cent from 10 months to two years; 8 per cent from two to four years, and 4 per cent four years or more.* If we add the first three percentages we find that *72 per cent of the total number of operations required a training time of less than nine months.* (See Chart I.)

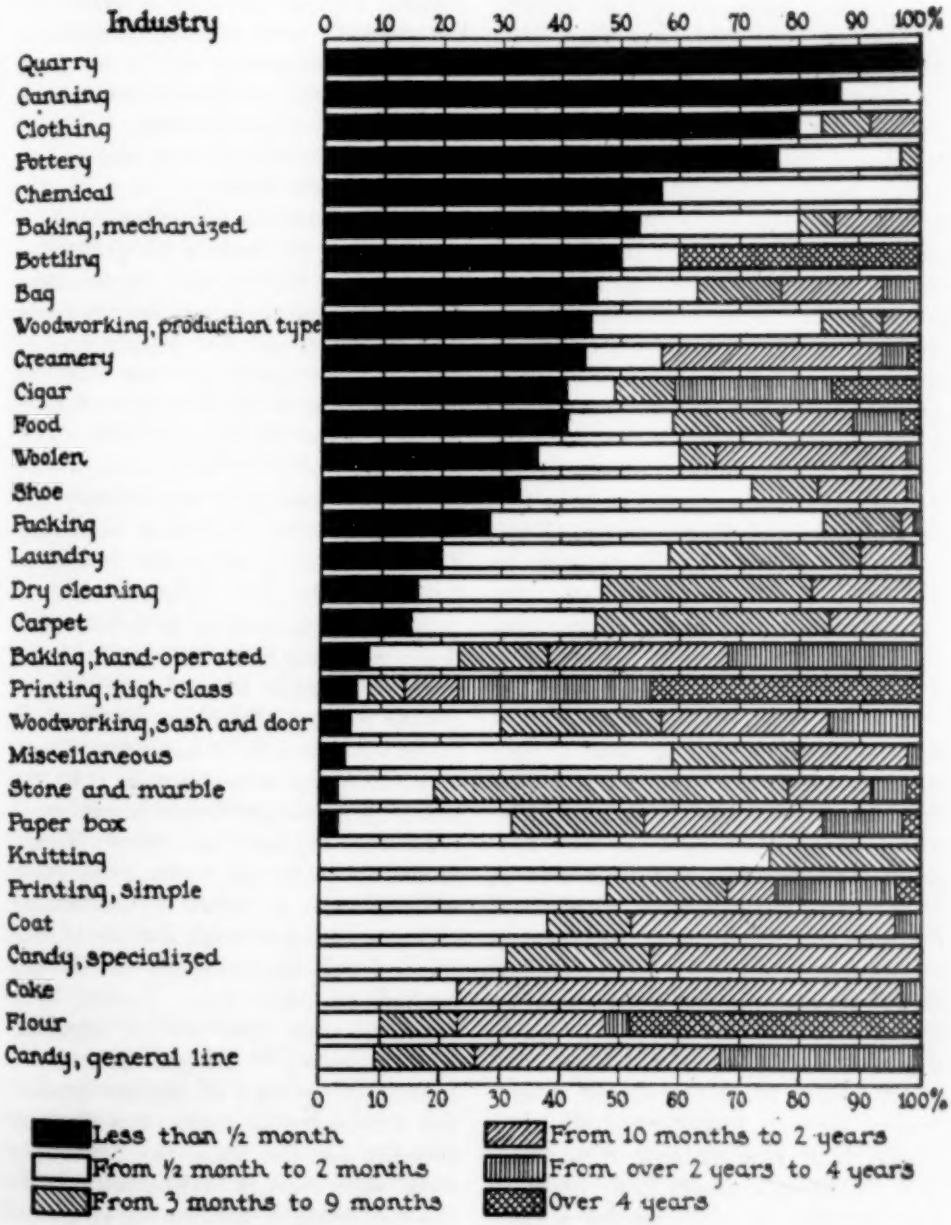
The time needed for training varies a great deal, of course, among the different industries. Hand-operated plants and mechanized plants within the same industry do not require the same training time for their operations. In machine bakeries a training period of less than nine months was sufficient for 86 per cent of all the operations, whereas in hand-operated bakeries this period was sufficient for only 38 per cent. In hand-operated bakeries 30 per cent of the operations required a training period of from 10 months to two years and 32 per cent from two to four years.

For simple printing jobs, envelopes, handbills, and other plain black and white work, the period of training was less than nine months for 68 per cent of the operations. But for high class color printing and the better grade of black and white work this period was sufficient for only 14 per cent of the

CHART I

LENGTH OF TIME NECESSARY TO TRAIN FACTORY WORKERS

(Expressed in percentages of operations)



operations; for 32 per cent a period of from two to four years was necessary and for 45 per cent more than four years. Some time ago, however, the general printing trades required an apprenticeship of four years and high class printing, photoengraving, etc., required an apprenticeship of seven years.

The stone and marble industry as well as the printing industry still needs highly skilled workmen, and 22 per cent of the operations require a training period of from 10 months to over four years. Formerly the average period of apprenticeship for this industry also was seven years. The general woodworking and metal working trades used to need a training period of four years; now even in the more specialized woodworking plants only 15 per cent of the operations need a training period of from two to four years and 30 per cent need less than two months. The percentages in the metal working industry are: one per cent over four years; 42 per cent from two to four years; 37 per cent nine months and less.

We see, therefore, that although in a few industries a training time of considerable length is still necessary, for industry as a whole the periods are relatively short. And short as they now are they can and will be further reduced by improved methods of production and by better machine layouts. In the press of modern competition manufacturers find it necessary to use every means in their power to reduce costs. The movement has already started in this area, but a great deal more can yet be accomplished through proper management.

The short training time now prevalent in industry affects both employer and employe. If highly skilled workers were necessary for his business, the manufacturer would have more difficulty in acquiring an adequate working force, and once selected he would be loath to lay off his men in slack times. Also, he would have to pay higher wages. Through division of labor and the resultant short training periods he can quickly expand or reduce his force as the demand for his product grows more or less, without losing a disproportionate amount of time and money in training new workers.

The employe, on the other hand, is able to reach the peak of his production sooner and thereby can attain more quickly the maximum pay for his work. The maximum pay for quickly learned jobs, however, is always less than for jobs requiring a higher degree of skill. Moreover, the employe has little choice in the kind of work he engages in. He accepts whatever jobs are available and he becomes not a tradesman but a production worker, to whom the product he turns out makes little difference.

Too many occupations have been practically wiped out by technological changes in the last century to proffer much hope for the return of the old order in which trades were the units of industry and long apprenticeships were common. In the last 15 years the movement toward mass production has been accelerated. Today, in the few surviving trades every effort is being made to reduce the importance of human labor through the use of machinery and the adoption of cheaper methods of production. Control by a union or some other type of organization has helped in the past to maintain a trade in the face of modern production trends, but in many cases the very necessity for the trade has been done away with through mechanization, division of labor, or substitution. Hundreds of examples could be cited, but there is space here for only a few.

In the automobile industry some years ago the cars were painted with varnish. The varnish could not be sprayed, and skilled workmen were needed to paint it on by hand. Eventually lacquer was substituted for the varnish. It could be sprayed, and the trade of painting the cars by hand had no longer any reason for being. Linseed oil pressing and flaxseed farming may be displaced in the future, for a synthetic substitute for linseed oil has appeared on the market. The trade of photoengraving, which, as we have seen, requires highly skilled workers, may disappear because of a photoengraving machine that has recently been invented. Industry does not want to be dependent on the trades and is constantly devising ways and means of eliminating them. To stem the tide of modern industry seems impossible. Compensations other than a revival of former conditions must be sought for the worker.

The apprenticeship system of training is today almost obsolete. Only 144 operations, or about four per cent of the 4,133 operations surveyed, were taught by this system. They included: one operation in a cigar plant, 21 operations in several candy factories, four in a bottling plant (by union agreement), three in a foundry, one in a food plant, two in a paper plant, nine in a sash and door plant, two in a paper mill, 68 in printing establishments, and 33 in stone yards.

Training by vocational or trade schools has supposedly replaced the apprenticeship system, but during the survey only two operations were found for which the workers had been trained in a vocational school. This number is so small it would hardly show as a percentage rating. On the other hand, 2,076, or 50 per cent of the 4,133 operations, were taught by foremen, and 1,591 operations, or 39 per cent, by experienced operators. Thus, training for 89 per cent of the operations was received within the plants. (See Chart II.)

That such a large percentage of all the training necessary in the industries studied is given by foremen or experienced workers calls forth certain criticism. If a plant is somewhat less successful than others in a community, whatever deficiency it may have is apt to become greater through the inbreeding process. If its methods of production are considerably inferior to others, the *rule-of-thumb method* of teaching its employes will hardly bring it to the point where it can compete with more efficiently managed concerns. Even assuming that foremen or experienced operators are capable of training workers, the practice of interrupting their regular duties with work for which in most cases they are not particularly suited is of questionable value.

Industry and the vocational schools should get together for their mutual advantage. The vocational schools have not yet realized their responsibility in training men to fill the needs of modern industry. Very few men trained in vocational schools were found by the job analysis staff with enough advantages over the men trained in shops to cause employers to prefer to hire them. Trades, as we have seen, are disappearing; yet the schools still teach separate trades.

It is a mistake to try to struggle against the ever increasing flow of production workers. Today factory workers should be taught not one trade but the basic operations of industrial production as a whole. The exact manner of handling a particular machine or of working a particular material is less important to know now than formerly, when jobs were less rigidly defined and less quickly learned.

A production worker would benefit more from training in *dexterity* and *bimanufiability*[1] than from detailed mechanical knowledge. And if he were trained to eliminate waste of materials, time, and motions or energy he would be invaluable to industry. An important part of vocational education also may be preparing the workman for enjoyment of the increased leisure that is very apt to become a regular feature in his life.

Mobility of the Worker. The data collected on this topic[2] reveal with what startling ease the workers shifted from one job to another within a plant and also from one industry to another. They show, moreover, not potential but actual mobility. Twenty-one per cent of the workers employed in furniture factories had come into the industry from an unrelated industry, but it does not follow that only 21 per cent could do the work without previous experience. (See Chart III.) Such factors among others as mental inertia, skill that the worker likes to exercise on a certain job, and preference for the work cause some men to remain in an industry or in one kind of work as long as possible.

Of the various industries the printing business had tolerated the least shifting. Ninety-four per cent of the workers surveyed in this industry had engaged in no other work. There are several reasons why printers have not become meat-cutters or meat-cutters printers. In general the machinery used in this industry is not entirely automatic. Skilled and experienced workmen are needed to set up work on the presses or to run linotype machines. The speed with which the work is done may be increased, but the degree of skill necessary has not been lessened. As we have seen, printing is still (and must be) largely taught through the apprenticeship system (see Chart II). And although the printing union is not particularly important in the area studied, its influence has been considerable in preventing inexperienced workers from finding jobs in the trade.

Of the workers studied in the baking industry, more than 96 per cent had shifted to baking from some other unrelated industry. A few years ago this proportion would have been a great deal smaller. Baking machinery has been developed to such a point that the old time all-round baker is no longer needed. In one plant that produced thousands of loaves of bread a day only one master baker was employed and he was the superintendent. Each job in the plant was a small bit of the whole, and in a short time any workman could become as proficient on his particular unit as a master baker.

Even in individual plants the mobility of the workers is great.[3] Since this situation holds good for all the different industries, it has been possible here to give figures for the combined industries. Most companies require their employes to work on dissimilar operations within the plant. Of all the workers studied, 80 per cent were performing more than one operation. It is true that the data were gathered during the years 1931 and 1932 when work was not so plentiful as it had been previously, but even in bet-

[1] *Bimanufiability:* the worker uses both hands at the same time but usually he does not do the same thing with both hands.

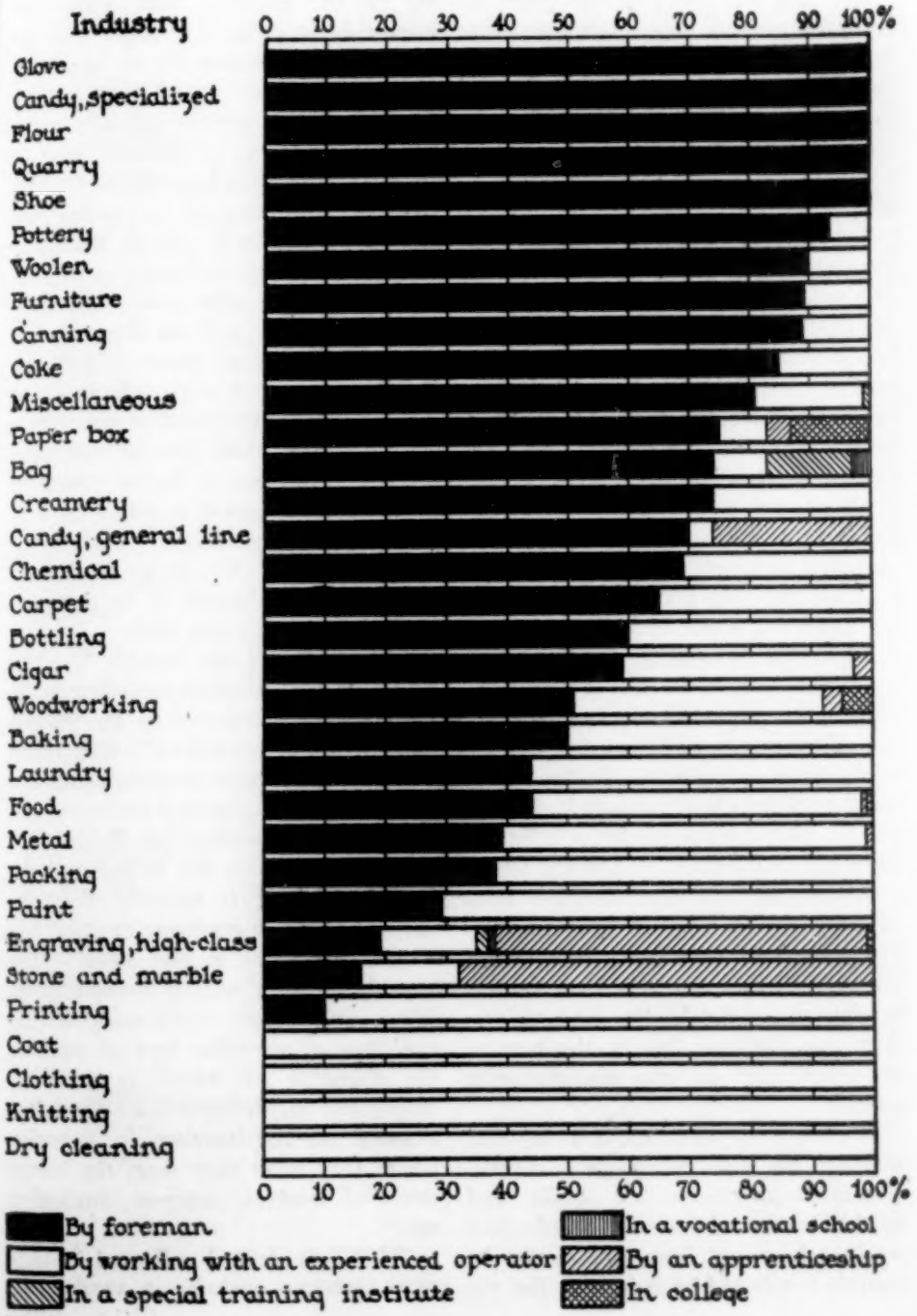
[2] This topic includes data gathered from the workers as to their major previous occupations and also the number of operations they had successfully performed in the plants in which they were found. The various periods of service they had spent in different industries is discussed only generally, for no definite trends in the movements of the workers as a whole were revealed by the data. (See operation sheet Figure 1.)

[3] Data gathered from workers on the topic: "What other operations has this operator performed satisfactorily in this plant?" (See operation sheet, Figure 1.)

CHART II

MANNER IN WHICH FACTORY WORKERS WERE TRAINED

(Expressed in percentages of operations)



ter times considerable shifting from job to job takes place within plants. In many cases it was the policy of the plant to move the workers about; the monotony of routine was relieved, but more important still the work could not be tied up through the absence of one employe.

Men move from metal working plants to bakeries, from woodworking plants to shoe factories, from ushering in theaters to bakeries, ad infinitum. Apparently, at least for the worker, the manufacture of cake has little to do with the manufacture of shoes. Yet the various jobs even on such remotely related products as milk and cast iron have common denominators. The leveler in today's factories is the machine, with its control levers, its stations for placing and removing material, and its power applications. Individual machines vary, it is true, but the variations are quickly mastered, since for the most part they involve learning how to control and where to load.

As the trades worker, fixed more or less permanently to one line of work, disappears, the production worker with certain characteristics of his own is coming to the front in industry. In the future many employers will want to know, not where a man has worked, but what he has done and what he can do. The abilities of a worker will then be proved by a series of tests designed to show what proficiency he has for the job he seeks. And the qualifications necessary for a job will be determined not by the kind of product manufactured, but by the type of operation used in the manufacturing process.

It must be remembered, however, that although the slight variations in simple, elemental operations are easily and quickly learned, differences in individual workers have not been and cannot be entirely eliminated by industry. But the job of production worker, or machine tender, does not change with the material or the machine with which the worker deals; rather it changes with the type of skill necessary for an operation. And it has been found that occupationally adjusted persons naturally gravitate to their proper occupational level or class. That is, most semi-skilled workers are happier working on the type of jobs offered by Classes C and D than they would be working on Class A or B jobs, although, on the other hand, technological improvement and the depression in business has forced many skilled mechanics to lower job levels. By grouping the individual differences of production workers, then, their general characteristics as a class may be found. Most of them fall in Classes C and D. Only in this way can production workers be broadly surveyed, for, as we have seen, groupings by industries or by materials worked upon mean very little.

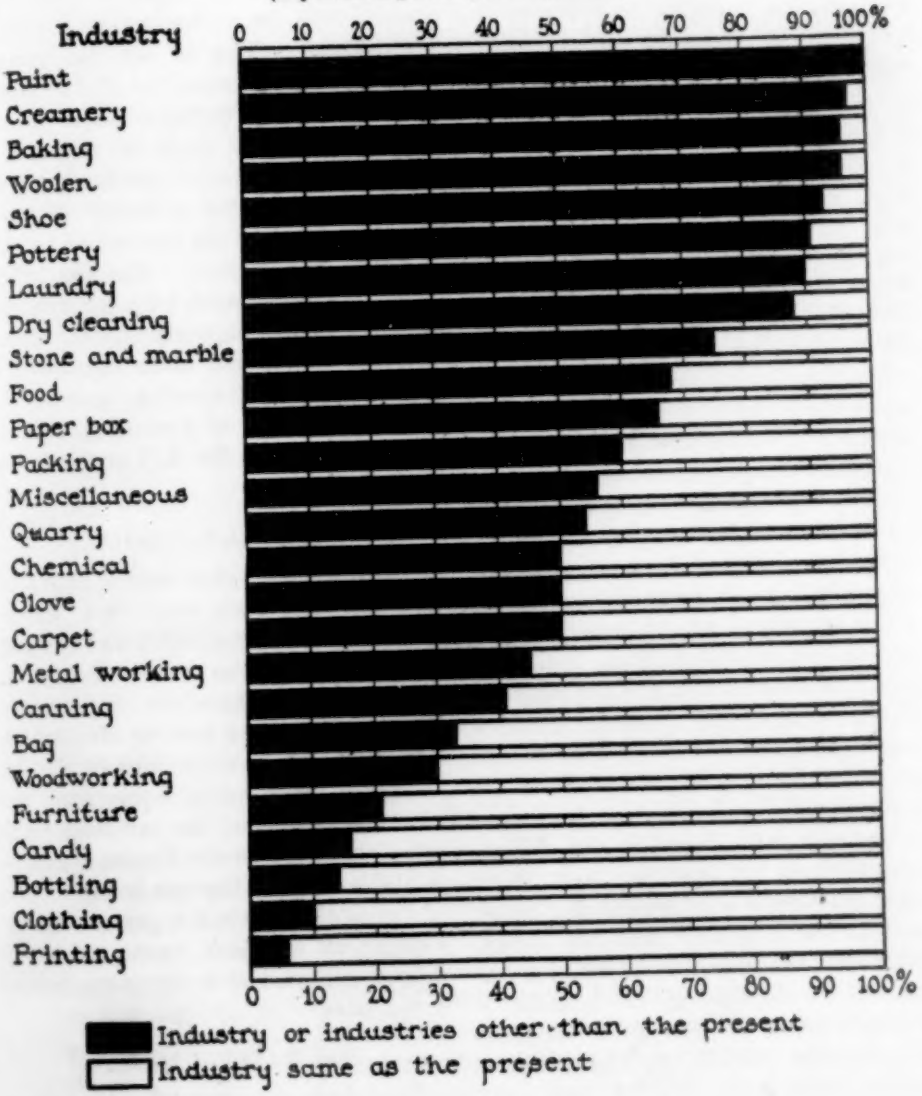
Classification of the Worker. Workers have here been classified according to the degree of skill required by the various manufacturing operations. The term "skill" has been used to mean a number of things and is somewhat confusing. In most shops the workers are divided into two general groups, the skilled and the semi-skilled. It is assumed that the skilled worker or mechanic can perform all the operations in one trade. The semi-skilled men usually operate turret lathes, drill presses, band saws, sewing machines, or any other type of machine the operation of which is relatively simple and highly repetitive. Unskilled laborers are not common in factories; where they occur they form the lowest strata of workers, sweepers, trucksters, etc.

"Skill," as defined and used in technical literature, includes in varying de-

CHART III

MOBILITY OF FACTORY WORKERS

(Expressed in percentages of operations)



grees both exercise of judgment and manipulative dexterity. Very often skill has been confused with proficiency. The conditions under which an operation has been performed must first be carefully studied and then the manipulative dexterity and the judgment necessary for the completion of the operation be carefully weighed, to determine whether the job requires skill or only proficiency. For this reason only persons familiar with the actual jobs and with working conditions should undertake the study of skills. It is not always apparent at first that expert operation of an engine lathe, expert reading of a printed page, good ditch digging, or any similar task that involves training does not necessarily require skill. Obviously, however, the person being tested in a psychological laboratory who learns how to tap his foot or to sort cards proficiently after a period of trial effort has no need of the skill of the worker who finishes photoengravings by hand or who produces an accurate and complicated punch press die.

The classifications of skilled, semi-skilled, and unskilled, then, are satisfactory as broad terms, but for purposes of this study certain arbitrary divisions have been made within the general classifications. Varying degrees of ability are required from individual workers; one of two men, both classed as semi-skilled, may perform an operation that needs more manipulative dexterity and more exercise of judgment than the other. Moreover, discrimination in ability is important in attempting to evaluate a worker's services to his plant. Because of this the skilled and semi-skilled classes were each divided into two groups, and a classification of five levels (A, B, C, D, and E) was made that covers the entire range of skills found in industry. Classes A and B include operations for which skilled mechanics are necessary, Classes C and D semi-skilled operators, and Class E unskilled laborers.[4] (See Chart IV.)

This classification groups industrial jobs according to the degree of skill they require from the worker to perform them satisfactorily. That is, not the worker but the job determines the classification. A toolmaker may perform simple operations with a drill press or a photoengraver may dig trenches, but because they happen to be skilled workmen whatever jobs they have are not counted as requiring skilled workmen. On the other hand, the skill needed for a job must be judged by what the worker actually does, how he does it, and under what conditions. Length of training, intricacy of the work, and use of precision tools also have a bearing on the skill necessary for an operation.

Class A—Skilled Mechanics

The jobs in this class require men who are masters of their trade, who understand their work thoroughly and comprehensively, and who are competent to work without immediate supervision. They necessitate the exercise of considerable judgment, accuracy without the use of jigs or other special equipment, and within the limits of the particular trade considerable initiative. Involved experimental work, and high-grade production or tool work for which a general knowledge of all machines, tools, and materials of construction is necessary, belong in this class.

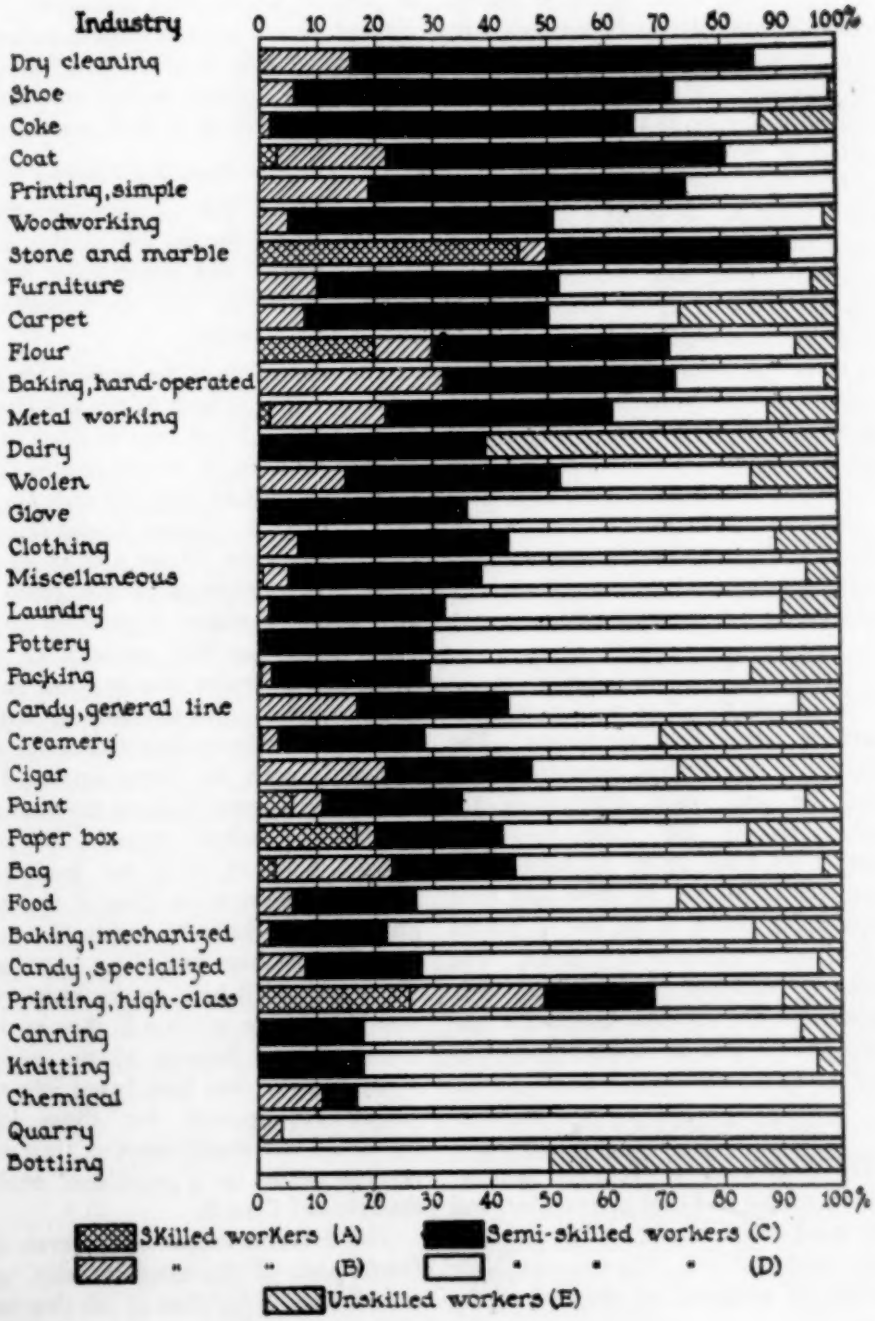
Class B—Skilled Mechanics

The jobs in this class differ from those in Class A largely in that they are repetitive. When an operation has been

[4] See Appendix for suggested list of occupations in each class.

CHART IV
CLASSIFICATION OF FACTORY WORKERS

(Expressed in percentages of operations)



performed several times, whatever difficulties it may have presented are for the most part solved. It may or may not still require the same degree of manipulative dexterity, but it by no means requires as much exercise of judgment. The skill necessary for the job is sufficiently lessened, therefore, to place it in Class B.

Class B jobs are partly pre-planned, and they need more supervision than the jobs in Class A. In general, heavy work that must be accurate, and small or medium-sized work that requires accuracy without the use of jigs or special fixtures but that is somewhat repetitive, belong in this class. Workers on these jobs must know machines, speeds, and construction materials; also they must know how to read blue prints and how to use precision instruments.

This class includes a large group of jobs not ordinarily done by factory labor: bricklaying, general baking, plastering, plumbing, paper hanging, etc.

Class C—Semi-Skilled Operators

The jobs in this class require machine operators rather than mechanics. The operations are highly repetitive; day after day and week after week the worker repeats the same operation, whether by hand or by machine. For these jobs, however, he must still have considerable ability in the use of gauges and in other methods of control. The work is pre-planned, the tools are usually pre-set, but the operator knows the machine and is able to make adjustments on it.

Class D—Semi-Skilled Operators

The operations in this class are extremely simple and highly repetitive, and they need only a short training period—three weeks or less. They require little exercise of judgment on the part of the worker. Qualifications for these jobs consist mainly of plain dexterity or the ability to load and unload machines and to perform simple hand operations. This class of jobs is large in modern industry, and undoubtedly as labor is further subdivided and training periods are further shortened it will increase in numbers.

Class E—Unskilled Laborers

No training, skill, accuracy, or knowledge is needed for the jobs in this class. Rough, simple, and interminably repetitious, they require only the expenditure of muscular energy.

The proportion of the workers studied who have jobs in each of the five classes is as follows: *2 per cent in Class A; 8 per cent in Class B; 34 per cent in Class C; 45 per cent in Class D;* and *11 per cent in Class E. Classes C and D combined account for 79 per cent of all the jobs.* The percentage of this group of semi-skilled operators is growing larger —50 years ago the majority of the workers were trades men and this group hardly existed. But whether the skilled mechanics are being demoted or the unskilled laborers are being upgraded is difficult to determine from the findings of the job analysis survey. We may assume, however, from the small percentage of workers in Class E that this group at least helps to supply Classes C and D with new material. Although Classes A and B have approximately the same percentage as Class E, they are less likely to give workers to the middle classes because they have fewer jobs and stricter requirements for those jobs. Normally, one would suppose, their percentage would be a great deal smaller than that of Class E.

The different industries, or even different parts of the same industry, vary considerably in the class of job they have

to offer to the worker. The marble and stone industry has the largest proportion of jobs in Class A—45 per cent. This industry cannot be mechanized to the same extent as others, for it has to do with the individualistic designs of architects. And the stone cutters must have skill of a high order to be able to carve the designs by hand in solid stone.

Fine printing has a rather high proportion of jobs in Class A (26 per cent), but it has a larger proportion in Class B (23 per cent) than the marble and stone industry (5 per cent). A number of industries have few if any Class A jobs (see Chart IV), whereas every industry has a substantial proportion of jobs in Classes C and D. The range extends from 70 per cent of Class C jobs in the dry cleaning industry to 96 per cent of Class D jobs in the quarry industry. Indeed, the workers on the jobs in Classes C and D form the backbone of our industrial system, and our schools and other social agencies should direct their efforts toward aiding them as much as possible.

The distribution of workers into the five classes made by the job analysis staff was compared with an academic intelligence rating of workers made by 20 industrial psychologists. The rating and the grouping were made independently and the findings later checked. Although the agreement between the two is not perfect, the tendency to show a relationship between the two methods of grouping is distinct. Following is a summary showing the distribution by classes of 53 industrial occupations, with academic intelligence ratings for the same industries:

Class	Number of Occupations	Mean	Difference
A	5	52.2	4.0
B	16	48.2	4.1
C	15	44.1	4.4
D	7	39.7	5.5
E	10	34.2	..

The following topics, "Calculations Necessary on Jobs," "Machine Set-Ups," "Accuracy," and "Blue Prints," bear out the generalizations that were made in the discussion of the classification of the worker.[5] If, on the whole, calculating on the job is not necessary, the set-ups of factory machines are simple; if little or no accuracy must be controlled by the worker, and if the reading of blue prints is no longer a part of the duties of the general run of workers, then the greater proportion of industrial workers will automatically find themselves in Classes C and D. Whatever their knowledge or ability most of the jobs open to them will need only semi-skilled labor.

Calculations Necessary on Jobs. Practically no type of calculation, it was found, was needed for the operations in the industries surveyed. Only three operations required a knowledge of addition and only four a knowledge of multiplication or division. There were none at all for which a knowledge of percentage, interest calculations, decimals, trigonometry, or calculus was necessary.

The work in a modern manufacturing plant is planned before it gets to the worker. Blue prints and instruction sheets are made by engineers and together with the division of labor they have reduced the necessity of calculating on the job to a minimum. The development of factories into large units has made possible the employment of engineers, for the number of jobs is sufficient to carry the expense they entail. These facts should be borne in mind by the heads of vocational schools who have made some effort to include shop mathematics in their curricula. The knowledge of shop mathematics may be necessary for some occupations, but in the industries covered by the job analysis sur-

[5] See pages 26 to 31.

vey no need for it was disclosed.[6]

Machine Set-Ups. The machine set-ups of 75 per cent of all the operations surveyed were simple. Only 25 per cent were complicated, and of these 11 per cent were handled not by the operator but by experienced set-up men. In general, then, the workers in the factories of this area need know little or nothing about tools or machinery.

Some of the jobs on which the machine set-up is complicated occur in the printing and in the woodworking industries. In printing high class color work considerable time and skill are required to set up the presses. In this case, because of union control and precedent, the work is handled by the operators themselves. In the metal working industry the set-ups of multimatic turret lathes or even of single spindle automatic turret lathes are complicated, but here the work is taken over by specialists. Again, it is the division of labor and the growth of factories into large units that have favored the employment of experts. The number of jobs handled on the machines is great enough to offset the expense of these men.

Accuracy. The accuracy necessary for an industrial operation is relative, of course, for up to the present time no absolute standard of measurement has been developed. To an astronomer a leeway of a million miles more or less is negligible in measuring the distance of the earth from a star, but to a physicist the difference of a millionth or even a billionth of an inch is vital in measuring the length of light waves. In industry the terms "gauge" and "micrometer" signify that measurements are made in thousandths and ten-thousandths of an inch to insure the satisfactory performance of an operation. This degree of accuracy may be built into a jig or fixture, however, and the measurements be controlled by machine. When "gauge" or "micrometer" accuracy was not controlled by the operator it was recorded by the job analysis staff as the simpler "scale" or "rule" accuracy.

Of all the operations surveyed, 90 per cent required neither "gauge," "micrometer," "scale," nor "rule" accuracy. In other words, the average worker had little to do with measurements. In the manufacture of the industrial products of this area accuracy was used, but to whatever degree it was necessary it was inherent in the machine and the operator was not particularly responsible for it.

Only three per cent of the operations used a gauge or micrometer accuracy that was controlled by the worker. These occurred in the metal working plants, on those machines for which there were not enough jobs to warrant the use of jigs or fixtures. Only seven per cent of the operations used scale or rule accuracy. Some of these were found in the clothing, building, printing, and electrotyping industries. In baking, linseed oil pressing, and the manufacture of candy practically no accuracy in the lineal sense of the term is necessary.

Blue Prints. The heads of some industrial schools believe, apparently, that the reading of blue prints is a very important subject in their curricula. Of all the operations surveyed, however, only four per cent necessitated the reading of blue prints by the operator. Ninety-six per cent required no knowledge at all of blue prints on the part of the worker.

It is not a question, of course, of the disappearance of blue prints from industrial production. On the contrary, they are being used even more widely than before. But in modern factories they are read by tool designers, by methods and

[6] See following section on "Blue Prints."

standards men, or, in poorly managed shops, by the foremen, who then pass on the information in one form or another to the workers. A few industries, the marble and stone, the woodworking, the metal working, and the toolmaking, still have jobs for which the operator himself reads the blue prints. Even here, however, the instructions for a considerable number of the operations are obtained from specialists.

Production workers are being called on less and less to exhibit a broad knowledge of industrial mechanics. On each one of the simple repetitive operations into which production has been divided they now find that a general knowledge of machinery, of gauge or micrometer accuracy, and of blue prints, is no longer necessary.

In Summary. The foregoing pages—Part II of this article—have given only a few of the total findings that were obtained through the job analysis survey. Yet from them alone it is apparent that vocational guidance and training need to take stock of their activities. Since skilled trades are disappearing, it would be far more economical both for workers and for vocational directors if training programs were prepared with this situation in mind. The fact that in any area 80 per cent of the factory workers are semi-skilled cannot be ignored indefinitely. Minnesota, moreover, is not a strictly industrial state. In other sections of the country where a greater proportion of the population is dependent for its livelihood on factories, the number of these semi-skilled workers would undoubtedly be still greater.

Probably one of the most constructive ideas that may be gained from this job analysis survey is that the needs of the workers in Classes C and D are pressing and should be given immediate attention. The logical beginning of a satisfactory program of necessary training for the production workers might well be in the vocational schools. The content of such a program is open to discussion, but certainly the typical trade approach does not serve the production workers in Classes C and D.

APPENDIX

List of Industrial Jobs in Skill Classifications

Class A—Skilled Mechanics

Art stone cutters
Assemblers of delicate precision equipment
Die sinkers
Electrotypers
Engravers
Filers on dies and gauges
Goldsmiths
Head flour millers
Lapidaries
Master paper makers
Pattern and model makers
Printers of high class color or offset work
Silversmiths
Tool makers
Watchmakers

Class B—Skilled Mechanics

Bakers in general bread bakeries
Beverage compounders
Blacksmiths
Boilermakers
Butchers
Buttermakers
Cabinet makers
Carpenters—all around

Carpenters—finish
Casters in foundries
Compositors
Coppersmiths
Custom job assemblers on operations that require fitting and adjusting as on locomotives and gas engines
Custom machine grinders
Dyers
Electricians
Founders in type foundries
Gas and steam fitters
Glaziers on building work
Heat treaters
Linotypers
Machinists, general, tool, and railroad
Metal buffers and polishers
Milliners on custom work
Millwrights on high class machines
Molders
Paper hangers
Plasterers
Plumbers
Saw filers
Screw machine setters
Sheet metal workers
Stone cutters
Stone masons
Tile layers
Tinsmiths
Toolsmiths
Typesetters
Upholsterers

Class C—Semi-Skilled Operatives

Annealers
Carpenters—rough
Cement finishers
Coopers
Cutters in packing plants
Dressmakers in factories
Drop forgers
Electrotypers
Forgemen
Furnace men in metal industries
Glassblowers in factories
Glaziers in factories
Hammermen in metal industries
Hand painters on building work
Loom fixers
Machine carvers
Machine cigar makers
Machine knitters
Marble polishers
Millwrights on general repairs (handymen)
Mule spinners
Pasteurizers
Pottery decorators
Pottery machine operators
Puddlers in metal industries
Rollers and roll hands in metal industries
Roofers
Repetitive line assemblers for accurate fitting work
Sawyers
Slaters
Smeltermen
Spray painters
Stationary engineers
Structural iron workers
Textile nappers
Wool card tenders

Class D—Semi-Skilled Operatives

Assemblers on simple line assembly
Bakery machine operators
Bag factory operators
Book gatherers
Bottle washers
Bottlers
Cigar factory strippers
Cranemen
Derrickmen
Die setters
Filers, who remove burrs, wire edges, and fins
Firemen (not railroad and fire)
Hand grinders of fins, sprues, gates in foundries
Hand painters on factory work
Heaters in metal industries
Hoistmen
Knitting mill operators
Oilers
Paper cutters and punchers
Paper folding machine operators
Pie fillers
Pottery sprayers
Poultry pickers and pinners
Shoe machine operators
Stitchers
Wool burr pickers
Wool duster tenders

TIME AND MOTION STUDY

Techniques and Their Application in Vocational Guidance

LILLIAN M. GILBRETH

MOTION STUDY is a philosophy of work, an attitude of mind, a method of stating, analyzing, and solving work problems, and a technique of measurement. In order to be most serviceable to those who may wish to use it for vocational guidance, it is necessary to discuss briefly each of its aspects.

II

SOCIAL PHILOSOPHY OF MOTION STUDY

As a philosophy, motion study is interested in looking for causes of effectiveness in work. It looks upon man as the center of creative activity, and thinks of tools, machines, and power as enabling him to accomplish more, with less effort and fatigue and with more interest in his work and in what it accomplishes. As a philosophy, motion study finds no difficulty in adapting itself to a changing world, and passes easily from the so-called Machine Age to the so-called Power Age, maintaining that Man is still the center of activity, and that making him effective is the aim of industrial and of social development.

This implies effective individual and social thinking. It covers a belief in individual differences and individual responsibility to use one's assets and compensate for one's handicaps by cooperating with others, for the common good. This the man trained in motion study finds easier to do than he would if he lacked such training—for he comes to know the importance of likenesses and of differences, of standards and of deviation from standards. A motion study philosophy helps one to a long-time view, to an appreciation of master planning, and to the habit of thinking in wholes as well as in parts. The motion study student knows that problems arise when there are delays because of getting materials or tools to the worker, or when there are delays because what he has made is not carried on for storage or use. He understands that production cannot be considered alone—whether one is making a unit for assembly, writing a letter, or baking a pie—but that one must think back to design and raw materials, and forward to final use and disposal. This habit of thinking in wholes is essential to a motion study man on the job; a willingness, aptitude, or liking for such thinking is an indication of a capacity for motion-mindedness, which is prerequisite for technical work in this field.

As an attitude of mind, motion study looks at work, in fact at all activity, as a combination of motions. Its aim is to make these motions efficient and productive, and it realizes that efficiency and even production must be thought of in term of intangibles as well as tangibles. The work done, or the outcome of the activity, must give satisfaction as well as show material results if there is to be true efficiency. This is not always understood. We call this attitude of mind *motion-mindedness,* and the man who has it visualizes a piece of work as the series of motions with which it can best

be done. He thinks first, naturally, of the standard set of motions, which will be a norm from which the necessary individual differences can be calculated. He thinks next, perhaps, if he is idealistic, of the ideal set of motions which would be made, if he who does the work were the best possible person, with the best possible material, equipment, and tools, and if the method used were the best available. If the motion study man is practical, he probably thinks of the men or women on the job, and of the changes that will have to be made, or allowed, to meet the need of individual differences, preferences, or notions. In any case, the picture that he will see will be apt to take the form of motion patterns.

III
THE MOTION-MINDED MAN AS A VISUALIZER

Obviously, this is likely to mean that the motion-minded man will be a visualizer, with a tendency or an aptitude to see things *in motion* rather than *at rest*. Acute hearing—the ability to note differences in sound or rhythm which are the result of different sets of motions—is of great assistance. Kinaesthetic discrimination—the ability to note and take advantage of acceleration and deceleration, of balance or imbalance—indicates a person with acute sensitivity, or one who realizes that this is an asset, uses all that he has, and tries to develop more in order to compensate in some way for what he lacks.

This may sound technical. It is not intended to be technical. Even a very young child may show the characteristics that mean that he is already motion-minded or may easily be made so. In fact we often wonder whether our chief work should not be with the little child, to insure all sense training possible and its practical use in effective work, in order to cause the desired attitude of mind toward efficient work. Perhaps "activity" would be a better word to use than "work," for the best training often comes in the sports, *i.e.*, swimming, skating, golf, tennis, billiards, baseball, and all the rest. Whatever the child's or the adult's chief interest is—music, sports, work—should be used as an illustration of what motion-mindedness can mean and can accomplish.

IV
MOTION STUDY AS A FORM OF ENGINEERING

As a method of stating, analyzing, and solving a work problem, motion study places itself among the techniques of engineering. It is a method of finding and stating facts, and of deriving from these facts the answer to the ever present question, *What is the best way to perform this activity which we are studying?* A problem clearly stated has passed the first stage of its solution. Motion study asks a simple, clear-cut set of questions. First, *What are you trying to do?* or *What do you want to do?* Second, as from long experience we have found it wise to ask, *Is it necessary?* If the answer is "Yes," we may ask "Why?" or, if the reason seems obvious, we may proceed to the next question. If the answer is "No," we should ask, if we are wise, *Then why did you want to do it?* for in the answer to that question may lie material that will account for satisfaction or dissatisfaction with the solution of the problem.

Let us illustrate. The problem is, moving and locating my desk which now faces the wall and is far from the door. *Is it necessary?* No, from the standpoint of conforming to the rules for proper location. The light comes over my left shoulder. I am not distracted

by people entering and leaving the room. All the things that I may need at my work are brought in to me and conveniently placed on my desk, and all that I do not need are quietly removed. But the answer, so far as my satisfactions are concerned, is, *Yes, it is necessary—because I prefer artificial lighting, as likely to be less glaring and more even throughout the day; because I like to sit with my back to the wall and facing whoever enters; because I am more disturbed by people passing behind than in front of me; and because I much prefer being so near the door that I can take in and pass out material, getting the exercise of rising, etc., eliminating the necessity of anyone's entering and disturbing a train of thought, and providing a rest period, physically, and by a needed shift of attention, as I choose.* This means that one must provide education as to the advantages or disadvantages of any change thought necessary, or reinterpret what "necessary" means.

V
THE BEST WAY OF WORK

As soon as the necessity for a specific motion study has been established, it is possible to ask two questions, which are often thought of almost simultaneously: *What would be the best way to do the thing, if I could have the best possible person to do it, the best materials, equipment and tools to do it with, work place to do it in, etc.?* and second, *What would be the best way, given the best* AVAILABLE *of each of these things?* We always try to group the ideal and the practical, to realize that there are two problems involved in any situation, finding out what would be the best way, if we could have anything we like, and finding out what would be the best, using what we have.

Perhaps this is as good a place as any in this article to discuss the so-called *One Best Way to do Work.* This phrase was intended to mean, "The best way available, given the persons, equipment, and tools in use, but with the right to improve the work place and the work method." This *One Best Way* was always understood to be open to suggestions for improvement, in fact to be progressing, as that became possible, toward the ideal way. It was used as a standard from which necessary individual deviations could be made. It was used as a norm to which one returned, after such variations, if they proved unsatisfactory and changes were necessary, or if it was decided that improvement on the standard itself could be made.

The One Best Way was never thought of as a pattern to which everyone must conform, no matter how much he rejoiced in assets or suffered from handicaps. There was no thought of a standard as a restricting thing. It was to be a source of stability and security. Its aim was to assure the skilled of the validity of their skill, to confirm and increase the skill of the best, but to make this skill available to all who would find it serviceable. In a group, the chief problem is to raise the poorest toward the average; the average toward the best; and possibly to make the best a little better. As a review of the techniques will show, the best method seldom consists in the consecutive motions of even the best of a group of workers. It is a summary of the best elements of a motion cycle, made available through a careful study of the better workers of the group.

VI
TECHNIQUES OF MOTION STUDY

When the problem has been stated and the necessity of its solution has been

established, the techniques of measurement (so often understood to include all of motion study) may be applied. By this time the motion study student will probably have recognized his own aptitude and liking for this type of work. The first technique used is that of making appropriate *Process Charts,* which present the problem in a simple easily learned and understood visual form.

The Process Chart consists of circles that represent the activity being observed as consisting of *work-being-done-while-the-thing-worked-on-is-at-rest,* or *while-it-is-moving-or-being-moved-to-another-place.* Or it may cover *a-person-working-while-he-remains-at-one-place,* or *while-he-is-moving-to-another, i.e.,* a man walking or standing still yet working all the time, as in a Ford assembly process. There are various types of Process Charts, and various sets of extremely simple or more complicated symbols, according to use, covering "inspection for quantity," "inspection for quality," types of transportation, etc.

The Process Chart presents the activity being studied visually, so that one can discuss the validity of the record, and then, when this has been established by corrections (including subtractions, additions, or changes), makes it easy to suggest improvements, to make Process Charts of projected changes, and to devise a set of *Possibility Charts.* These latter outline the suggestions in visual, comparable form, and make it possible to calculate costs in money, time, and energy, in advance. They also provide a record of all suggestions, rejected and accepted, that may be filed for reference, and used any time that the activity is subjected to another study.

The easiest and best way to use the Process Chart as a test of aptitude for motion study work is to make a simple Process Chart in order to see how well one can succeed with it, how much one likes the work, and how eager one is to go on into other techniques. This is our usual procedure in using the Process Chart as a training method in motion study.

A study of the completed Process Chart usually indicates to what extent further techniques of *Motion Measurement* are necessary. Sometimes the charts themselves will indicate all the economies of time and energy that are required. In that case these are made, and the motion study considered complete, for the time at least. In other cases, a more detailed study of one or another of the elements of the process, as shown in the chart, is indicated. Sometimes time study techniques, as embodied in the use of the stop-watch, will be sufficient. These have been so well described in the standard time study books, *Time and Motion Study,* by Lowry, Maynard, and Stegemerten, and in *The Management's Handbook,* edited by L. P. Alford, and *The Handbook of Business Administration,* edited by W. J. Donald, that it is unnecessary to go into them here. The handbooks, which do a good job in describing motion study, can perhaps be supplemented by reading Mogensen's *Common Sense in Time and Motion Study.* All that it is necessary to do in this article is to stress the implications for vocational guidance of each technique.

VII
MICROMOTION STUDY

Anybody who has studied a Process Chart, especially a person who has made even a simple one, will know whether he feels interested in and drawn to this type of technique or not, and whether he feels the urge to go on, studying the refinements of motion measurement. If

you want to know "Why?" we can tell you why—by *micromotion study* and the *cyclegraph method*. We subject the activity under study to a record by a standard or special motion picture camera, with a clock that records to one two-thousands of a minute in the field of the activity, so that the motion cycles will be recorded along with the time that they take. We include also, if possible, a cross-sectioned background, in order to make it easier to take the record from the film, and transfer it to *Simultaneous Motion Cycle Charts*[1] and *Motion Models*.

VIII
PREPARATION IN MOTION STUDY

Here again, actual participation in making a micromotion study record is the best test for aptitude. One may test one's interest by reading about a film, or by seeing one projected, but nothing is so good as watching one being taken, and if possible helping. An opportunity for this is not difficult to get. Not only are many industries, as well as hospitals, libraries, sports associations, etc., making such films, but many colleges as well, especially the technical schools. We look for the day when the pioneer work in vocational schools will be supplemented by work in other schools, from the pre-school nursery through the graduate school.

The next technique is the transfer of the data from the film to the *simo-chart* (Simultaneous Motion Cycle Chart) already referred to. The purpose of the Simo-chart is to record elements of the motion cycles presented by the film, or the *therbligs*,[2] as they are called. There are 17 of these, which are used to record the film data on a chart that is made on the standard cross-sectioned paper, with the time indications running perpendicularly and the parts of the body running horizontally. When a chart is complete we can see exactly what was done by the body, and the time occupied.

IX
A PRACTICAL SUGGESTION

As a final text, let us suggest the problem of working out a motion-studied work place, for any kind of activity. The height should be such as will enable the worker to work with equal ease standing or sitting. This is calculated by measuring the height of the worker's elbows from the floor, and so placing the work surface that he can work "at ease," neither bending over nor straining upward. A proper chair must be supplied. The circular work space, which enables the work to be done within the least fatiguing area, is calculated by letting each arm swing in an easy arc across the body, and in all directions. The "work material" and "tools" (and these terms cover anything from the material for mixing a cake, typing a letter, assembling a gadget, performing a minor operation, making a figure eight, etc.) should be arranged so that the human element can be conserved—so that the worker can best and most easily express himself. Look for causes, evidences, and means for eliminating or compensating for fatigue. Consider the absence of, or the presence of, *skill*, which you should teach, conserve, and develop. Do the best job that you can in using your motion-mindedness and develop that of the person who is to use the work place. If you set up an effective work place, even one that is more effective than it was, above all if you enjoy the assignment, you will be welcomed into the field of motion study. It is in the hope that we may enlist recruits that this article is written.

[1] See Figure 3, page 44.
[2] See Figure 1, page 43.

THE ANALYSIS OF SKILL

MILDRED FAIRCHILD

EVERY vocational counselor in the western world today is burdened by the task of advising young people to enter occupations where neither the nature of work nor the extent of opportunity can be known or foretold with certainty. The effort to develop scientific methods for analyzing individual capacities finds itself baffled by the uncertainty attending technological advance and occupational change. The old familiar trades are doubtful havens for young students and apprentices when the very nature of the trade is as unsettled as is the demand for the workman.

II
IS SKILL NECESSARY?

Under these circumstances, skill is a debatable characteristic. What it is, where it exists, or where it might be advantageous are practical, not academic, questions. But they are questions that are difficult to answer. It is important, nevertheless, for vocational guidance to know at this time, not only what types of young persons will fit best into occupations requiring certain grades or degrees of skill, but how extensive will be the demand for any particular grade of skill in each occupation. Is skill an essential element in modern industry? And given a condition of wide unemployment, is the skilled workman more or less secure in his work than the unskilled laborer?

Viewed in their entirety, these questions are rather staggering, yet with technological and economic conditions that render the individual youth, or even the adult worker in factory or office, increasingly unable to cope satisfactorily with his own adjustment and placement, counselors are faced with the necessity of answering them. If they fail to do so, how are they to advise or train young people in their effort to get a foothold in the economic world of capitalistic industry today? The evaluation of skill requirements needed to perform specific tasks seems to be increasingly important.

III
THE NATURE OF SKILL

For the sake of clarity, let us assume that we mean by the word *skill* not simply the ability to do some particular task well, but also the ability to produce a specific product or result well, even in a varied situation. The definition of skill given by Professor Pear, of the University of Manchester, seems to the writer the most satisfactory one yet devised. "Skill," he says, "is the integration of well adjusted performances." He adds, in further discussion, that it must be adaptable under varying situations to the attainment of a desired result.[1] The ability to perform with dexterity some specific act, therefore, such as feeding rapidly and with coordinated movements a punch-press or a stamping machine may be considered as requiring some degree of skill, if practice has been essential to its best performance. But the ability to

[1] Pear, T. H., "The Nature of Skill," *Journal of National Institute of Industrial Psychology*, October, 1928, Vol. IV, No. 4, pp. 193-194. See also, "Skill," *Journal of Personnel Research*, April, 1927, Vol. V, No. 12, pp. 478-489.

turn or bore a metal part on an engine or turret lathe with speed and accuracy, particularly if the parts to be worked are not always alike, may be counted as involving a superior brand of skill. Both operations turn out a product that requires accuracy to a thousandth or ten-thousandth of an inch, perhaps. Both operations take practice to perform rapidly and perfectly. Both, probably, require some sort of kinaesthetic and sense adaptation; fingers, that is, that have learned how to place and remove the part without fumbling, or an arm movement that operates the levers of the machine quickly and without waste motion. But when one has listed these things, one may have exhausted the similarities between the operations. The lathe operator must have considerably more ability to handle his material and his machine in a variety of ways, probably, than the punch-press operator. The lathe operator on less repetitive work must have more of such ability than the one on more repetitive work.

IV

TRADITIONAL METHODS IN THE MEASUREMENT OF SKILL

Various methods of measuring or evaluating the skill used in a specific performance have been attempted. The first and most common one has been by measuring output or the quantity and quality of production. Book, in his analysis of learning curves in typewriting, Bryan and Harter in their studies of telegraphy, Elton, Weston, Smith, and Wyatt in the work of the National Institute of Industrial Psychology in Great Britain, all have used output during a given period as a measure of proficiency.[2]

This method has the important advantage of complete objectivity, and if it is used with care and precision, it can give a quantitative measure that is scientifically exact. Even quality of product can be measured in quantitative terms according to established standards and can be combined with quantity in a way that will give a useful yardstick of productive capacity that is applicable to different individuals and to the same individuals at different times. But the measurement of output in no way considers the individual differences or characteristics of the workman in his performance; and it gives no kind of comparative measure for the proficiency of workmen turning out even slightly different products. The number and perfection of holes punched in a given task can bear no relation to the quantity and quality of holes bored or even finished in another task. It makes no attempt to develop an instrument for such measurement; yet that is precisely what the vocational counselor needs.

A second method of measuring skill development has been devised in the trade or performance test. The test may be simply a performance of a particular job or it may consist in the handling or identification of particular tools or parts used in that job. Testing out an applicant for work by having him perform a specified task is as old as employment itself. Standardizing the performance and rating the performer accordingly has been common practice in German apprenticeship. And various standard trade tests, both performance and identification tests, have been used in American fac-

[2] Book, W. F., *The Psychology of Skill.* Gregg, New York, 1925, Chapter II; Bryan, W. L., and Harter, N., "Studies in the Telegraphic Language," *Psychological Review,* 1899, Vol. 6, p. 356; Elton, P. M., *Analysis of Individual Differences in the Output of Silk Weavers;* Weston, H. C., *A Study of Efficiency in Fine Linen Weaving;* Smith, May, *Some Studies in the Laundry Trade;* and Wyatt, S., *Variations in Efficiency in Cotton Weaving,* Industrial Fatigue Research Board, Reports Nos. 17, 20, 22 and 23, London, 1922.

tories and offices. Standard typing tests measuring both speed and accuracy are probably examples of a kind most commonly used. These again have the advantages and disadvantages of the measurement of output. At the same time, by selecting and standardizing certain grades of performance one achieves a degree of comparability between the various grades quite impossible with a simple measurement of production on a given task.[3]

Closely related to these performance tests are the mechanical ability tests such as those developed by Stenquist and O'Connor and at the University of Minnesota. These are, of course, attempts to evaluate native capacity without regard necessarily to a skill resulting from training and practice. They are invaluable for analysis of individual capacities, when their reliability and validity have been fairly well established and when, like any test, they can be administered properly. When in addition they are combined with other means of evaluating personal characteristics and capacities into a profile such as the Employment Stabilization Research Institute at Minnesota has been working out, they become exceedingly suggestive for guidance as well as placement. But not native capacity, nor even motor capacity, is skill.[4]

The attempt, in more recent years, to develop objective and standardized tests of skilled performance, or rather of performance requiring skill, such as those devised by the psychotechnicians of Germany and the National Institute of Industrial Psychology in England, seeks to apply the objective testing technique to an evaluation of trained performance. For example, a small instrument controlled by two small wheels or cranks requires that the person being tested trace a line around a given course without deviation beyond prescribed limits. The direction of his pencil is controlled entirely by the movements of the small table or plaque to which his course is fastened, and over which his pencil is suspended. He may move the table backward or forward, and to the right or left, as he deems necessary, by means of his crank controls. The performance is graded by the number of deviations in the prescribed course. Obviously, the performance is analogous to that of operating a lathe.

The advantages of such a test rest plainly in its objectivity. Its disadvantages appear in its analogous character; it can never test the performance itself which it is intended to evaluate. It requires a large amount of experiment to establish its validity and at that it can distinguish only rather roughly between various grades of lathe performance, a very real handicap with changing techniques. Coordinated motor responses, moreover, which are tested, indicate the performer's adaptation to his machine; but these are only a part of a turner's skill in handling and working materials.[5]

V

A NEW APPROACH IN THE MEASUREMENT OF SKILL

An entirely different approach to the

[3] See, for example, Amelia E. Weiss Long and G. H. Pear, *A Classification of Vocational Tests of Dexterity*. Industrial Health Research Board, Report No. 64, London, 1932; J. C. Chapman, *Trade Tests*. Holt and Co., New York, 1921.

[4] Stenquist, J. L., *Measurements of Mechanical Ability*. New York, Teachers College, Columbia University, Bur. of Publ., 1923.

O'Connor, Johnson, *Born that Way*. Williams & Wilkins, Baltimore, 1928.

Paterson, D. G., *et al. Minnesota Mechanical Ability Tests*. Univ. of Minn. Press, Minneapolis, 1930.

[5] For a fuller discussion of tests of dexterity and skill see Amelia E. Weiss Lang and T. H. Pear, *A Classification of Vocational Tests of Dexterity*, Industrial Health Research Board, Report No. 64, London, 1932.

problem is one by which the writer, with the assistance of graduate students at Bryn Mawr College, attempted to evaluate the skill exhibited by a group of workmen in cutting and working metals. The technique adopted was an adaptation and extension of job analysis, using, therefore, an observational rather than a testing procedure. Gilbreth *motion study* was used,[6] supplemented by a system of *skill notation*. Typical jobs were analyzed of 75 good to average workmen in the light machine shops of four metal plants. Process charts were made of each performance analyzing it into *therbligs*, or the significant elements of the operation in order of their sequence as the Gilbreths have distinguished them. Alongside the therbligs were charted the significant manifestations of skill in so far as the investigators could isolate and observe them; the skill in turn being analyzed into *skill factors* to make it readily observable. The so-called skill factors were thus related directly to the therbligs or elements of the performance.

To refresh the memory of any who are not familiar with them, the therbligs, as the Gilbreths have developed them with the symbols used in their notation are shown [7] in Figure 1.

Figure 1

GILBRETH SYSTEM OF THERBLIG NOTATION

Search	
Find	
Select	
Grasp	
Position	
Transport loaded	
Assemble	
Use	
Disassemble or take apart	
Inspect	
Prepare for next operation or pre-position	
Release load	
Transport empty	
Wait (an unavoidable delay)	
Wait (avoidable delay)	
Rest (for overcoming fatigue)	
Plan	

The skill factors used and the symbols devised to represent each are shown in Figure 2.

Figure 2

SYMBOLS OF SKILL NOTATION

Adaptation to machine	
Adaptation to materials	
Adaptation to tools	
Accuracy of movement	
Motion saving	
Adaptation of energy to need	
Self confidence	
Plan	
Sensitivity of eye	
Sensitivity of ear	
Sensitivity of touch	
Sensitivity of taste	
Sensitivity of smell	
Kinaesthetic sensitivity	

The performance in terms of therbligs and related skill factors was charted into what was called a *simo-skill-chart* or a Gilbreth simultaneous-motion-cycle chart with the skill notation accompanying each therblig. The therbligs were noted as of uniform and arbitrary length for most of the charts regardless of the time consumed in their performance. The simo-skill-chart is illustrated in Figure 3.

By relating the number of skill factors noted in any performance to the number of therbligs in the performance, one devised a *therblig-skill* average. This, in turn, by comparison with norms for the

[6] See article by L. M. Gilbreth, *Time and Motion Study Techniques*, pp. 35-39, this issue.

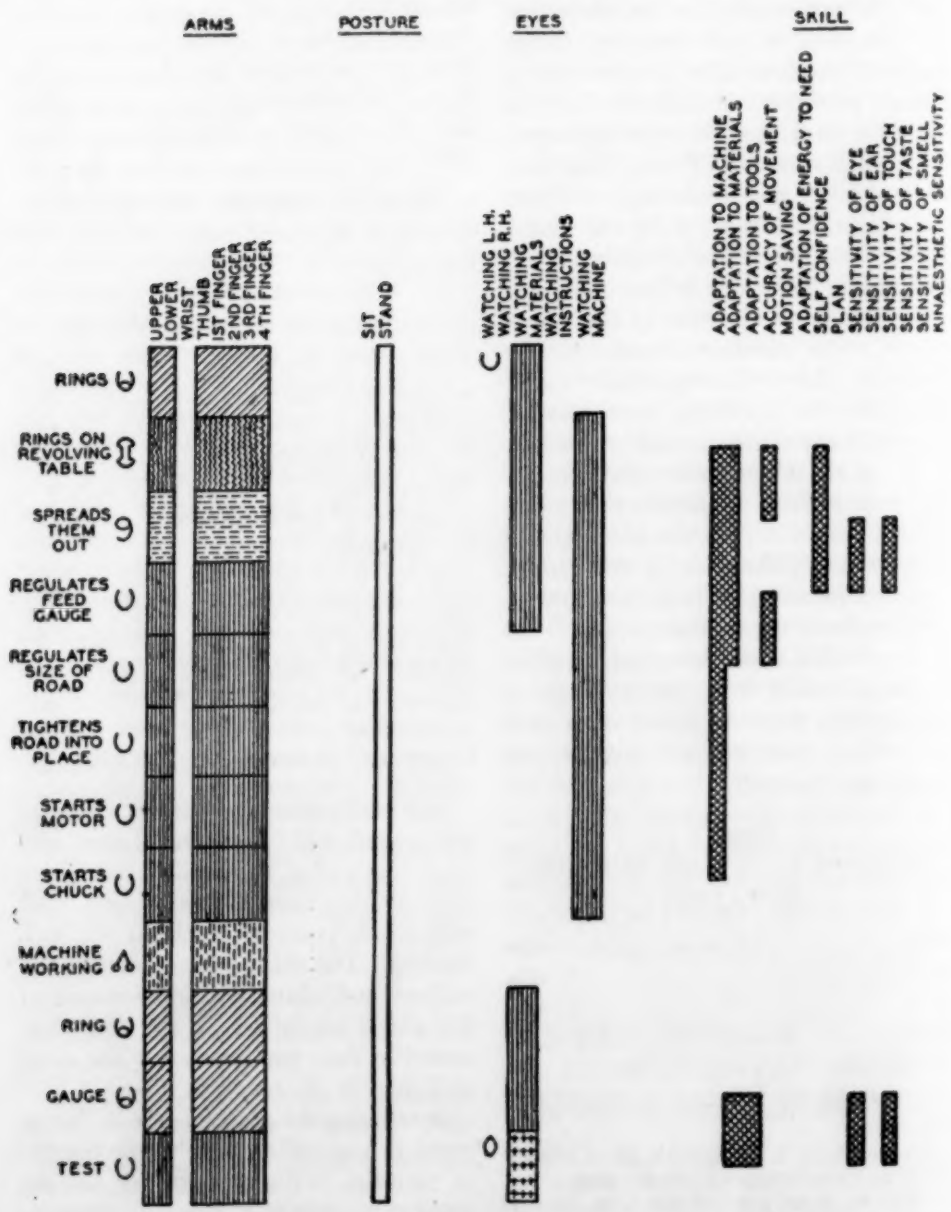
[7] Gilbreth, F. D., and Gilbreth, L. M. *Applied Motion Study*. Sturgis & Walton, New York, 1917.

Figure 3

SIMULTANEOUS-MOTION-CYCLE AND SKILL CHART

Machine: Blanchard Automatic Part: Outer Race Ball Bearing

Operation: Surface Grinding



selected performance studies, gave one a *skill index* that proved to exhibit a considerable degree of validity. Indices were worked out relating the individual performance: (1) to others of its exact kind, (2) to all those selected in the particular shop, and (3) to all the performances studied. The range of indices proved highly significant.[9]

The obvious disadvantage in the skill index so devised lies in its subjectivity. No means was found for detecting a specific skill factor except the subjective judgment of the observer. Plainly a skill factor that could be recorded by an objective process would be infinitely superior. The advantage of the method was in its flexibility and comparative ease of application to many industrial processes involving manual skill. In addition it took into consideration a whole performance and not simply some aspect of it.

A second disadvantage appeared upon closer observation in the nature of the therblig. Elements of motion so broadly conceived as *use* or *assemble* contain, within themselves, a whole array of movements involving skill, whose notation becomes, consequently, inexact from a scientific point of view. But the therblig, again, has a flexibility in use that, so far as the writer knows, no other form of job analysis has developed.

VI
THE SIGNIFICANCE OF SKILL EVALUATION FOR VOCATIONAL GUIDANCE

For the vocational counselor, the significance of this or any other method of evaluating skill on the basis of a job analysis, resides in its practical applicability, not so much to the young person requiring guidance as to a typical performance in a trade or occupation toward which he might be guided. Plainly, one must begin to determine, not only the capacities of the applicant, but also the opportunities and limitations of a trade. Guidance looks toward the fitting of the one to the other in so far as it becomes possible. Vocational training, itself, calls today for an ever increasing knowledge of the needs and requirements of the trade and a more exact analysis of its principal and typical characteristics. Rapid change in techniques and processes intensifies that need.

A line of research needed for vocational guidance, then, must look to finding ways of determining the requirements and opportunities in the jobs which industry and business make available. Job analysis, as so far developed, lays a basis for the desired techniques or methods of study. But job analysis, obviously, must be supplemented by job specifications. The refinement of these specifications and their development in flexible yet standardized forms seems to the writer most necessary to sound and effective practice in the future of vocational guidance. In these specifications the place of skill is vitally important.

Quite incidentally, the use of detailed motion study accompanied by some such skill notation gives evidence of being invaluable in acquainting the observer, in much less time than performance can do, with the nature of the operations and processes observed. Motion study has been suggested before this as a useful means of teaching, not to displace, but to supplement performance.[10] In so far as one can yet determine the nature of skill, no observation would supplant

[9] For a complete description of methodology and findings, see M. Fairchild, "Skill and Specialization," *Personnel Journal*, Vol. IX, No. 1 and 2, June and August, 1930. See also Morris Viteles, *Industrial Psychology*, W. W. Norton & Co., Inc., New York, 1932, pp. 160-164.

practice in giving one proficiency in a performance requiring skill. But actual skill in performance is hardly possible to either counseling or placement which requires a knowledge of, or acquaintance with, a wide variety of occupations. Practical application of motion study techniques, on both a more extensive and intensive scale than has been attempted, might prove them to be useful tools for guidance itself.

The principal need for the analysis of skill, however, arises from the necessity of determining its function in present and future vocations. The importance of skill in modern industrial technology is not easy to determine. The events of recent years would seem to indicate a steady decline in the need for skill development in industrial or even business processes. On the one hand the technique of the engineer, on the other hand the power driven, automatic machine, encroach steadily, it would seem, on the place of the skilled workman or office clerk. The skilled instrument or die maker, the skilled tool maker and all-round machinist in some assembly and maintenance work, seem still to be needed. Analysis of employment records shows that the depression has even displaced many of these, and it is yet too soon to tell whether or not recovery and further expansion can be sufficient to reabsorb them. One is tempted, certainly, to assume that this is impossible under our present structure. Construction, transportation, oil refining, coal mining, textiles, clothing, foods and shoe manufacture seem to continue their development of the automatic, power driven machine. In a recent statistical analysis by Arthur Beal from the U. S. Bureau of Labor Statistics, only steel rolling and motor vehicles out of eleven industries studied showed any tendency to slow down their rate of increase in man-hour productivity. At the same time the rates of increase in the different industries studied show great variety. One can hardly assume any specific increase.[11]

The counselor's task, therefore, is twofold. One must see and appraise the immediate opportunities for young people wherever they may lie. One must, also, endeavor to foresee the long-time development due to come in nearly all trades and occupations with the extended use of electric power and mechanical invention. For both tasks, the analysis of the skill in use, and a study of its changing use is needed.

Obviously, continual industrial expansion must accompany technology today. Only continual expansion can solve the problem of shortage in opportunity that now confronts young people. The failure of such expansion can lead only to the repression of creative powers for many people and to ever increasing insecurity for all people. Yet the increased labor costs resulting from the decreasing hours and increasing wages that will be necessary to reduce unemployment and raise consumption to anything like the level of productive capacity are likely in turn again to induce capital in its search for profits to substitute further mechanization for human labor and human skill.

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[10] Mogensen, Alan H., *Common Sense Applied to Time and Motion Study.* McGraw-Hill, New York, 1932.

[11] "Dispersion in Man-Hour Productivity Since 1929." Paper delivered before the American Statistical Association, Philadelphia, December 27, 1933.

THE JOB PSYCHOGRAPH IN JOB ANALYSIS

JAY L. OTIS *and* KINSLEY R. SMITH

JOB ANALYSIS has been defined as "the scientific study and statement of all the facts about a job which reveal its content and the modifying factors which surround it." [1] It involves a "determination of the essential elements in the job and the qualifications a worker should have for its successful performance." [2] Hackett's more specific definition points out that the *job specification* or description arrived at in the process of job analysis has two aspects, a *job aspect* which is a statement of the features of the work, and a *man aspect* which is a description of the physical and mental requirements necessary for successful performance on the job.

Limitations of Job Specifications. The man aspect of the job has often been seriously neglected by both industrialists and agencies interested in the preparation of occupational studies as a basis for vocational guidance. Many job specifications are limited to a description of duties and working conditions. In some instances where personnel requirements are included these are limited to statements concerning such factors as age, sex, health, and nationality. They often make no attempt to designate the mental abilities and other traits necessary for success on the job. Sometimes a description of such traits is included, but this is presented in such indefinite terms that a clear understanding of the nature of the required mental traits is lacking. Although the occupational studies are admirable in many ways, and are often based upon a careful investigation of a large number of firms, they exhibit two outstanding weaknesses. In the first place, the statement of qualifications is given in vague terms which are left undefined. This procedure leads to confusion in that conflicting ideas about the qualifications are conveyed to different readers. In the second place, the extent to which each ability is necessary for success is not indicated and the relative importance of the necessary abilities remains unstated.

II
THE JOB PSYCHOGRAPHIC METHOD IN STATING QUALIFICATIONS

A Standard Terminology. An attempt has been made by Viteles [3] to overcome this by development of a job psychographic method for use in stating the abilities required for success on a job. In this, use is made of a list of 32 standard terms (shown on page 51) each specifically defined so as to convey the same meaning to independent investigators. Typical of the definitions are the following:—

[1] Tead, Ordway, and Metcalf, H. C. *Personnel Administration.* New York, McGraw-Hill Co., 1920, p. 255.

[2] Hackett, J. D. *Labor Management.* New York, D. Appleton and Co., 1929, p. 161.

[3] Viteles, M. S. "Job Specifications and Diagnostic Tests of Job Competency Designed for the Auditing Division of a Street Railway Company." *Psychological Clinic.* 14. 1922, pp. 83-105; "Job Analysis in Vocational Guidance," *Psychological Clinic.* 15. 1924, pp. 157-182; *Industrial Psychology,* New York, W. W. Norton Co., 1932, pp. 150-53.

2.* RATE OF DISCHARGE. *By this is meant the speed with which energy must be expended on the job. In some jobs, such as that of the longshoreman, much energy is expended, but it is discharged slowly, while in others much energy must be expended with great speed, as in emergency work on overhead lines. On the other hand, there are jobs in which the energy demand is low, and energy may be expended at either high or low speed.*

6. COORDINATION (B). *This refers to the harmonious combination of visual and muscular functions on the job. It is movement controlled by sight. It is important, for example, in such a job as telephone operating, in which the operator is required to place a plug into a hole of small diameter, the location of which is perceived through the eye. At the other extreme is that of loading crates or bales into a box car, in which Coordination B is a negligible factor.*

25. OBSERVATION. *By this is meant the ability to direct attention so that no detail of the performance remains unnoticed. The individual must always be aware of what he is doing, continuously giving heed to the minute details of his job activity or surroundings. The job of proof-reading, for example, would be rated high on observation because it is necessary for the proof-reader to notice every small detail of the copy. This is likewise true of most inspection jobs. Copying from rough draft would also be rated high on observation, although not quite as high as proof-reading. In such a job as shoveling, observation would be rated low.*

A Standard Rating Technique. In addition to providing a standard list of terms and an exact definition of each, the job psychographic method provides a standard scale for designating the importance of each ability on the job. The units in the 5-point scale used for this purpose are as follows: (1) negligible, (2) barely significant, (3) significant, (4) of great importance, (5) of utmost importance.

"In other words, thinking in terms of the mental abilities which are called for on a given job, '1' means that the importance of the ability so rated is practically negligible in job success; '2' means that this ability is called for to such a slight extent on the job that a deficiency in it on the part of the worker interferes only slightly with the capacity of the worker to perform efficiently the duties of that job; '3' means that the ability is significant, but that it is not one which particularly distinguishes this job from other similar jobs; '4' means that the ability is essential and that it is called for to such a great degree that a deficiency in it on the part of the worker engaged on the job would interfere seriously with the efficiency on the job; '5' means that the job requires this ability to such an extent that a deficiency in it on the part of the worker would make him absolutely incompetent to fill the job." [4]

The Job Psychograph. These ratings are graphically recorded on a form such as that shown on page 51, to produce a job psychograph which shows at a glance the abilities that are most essential to success and their general relation to each other and to less important abilities. There are clearly outlined on such a job psychograph the *keystone specific abilities* which must be particularly consid-

* The numbers parallel those shown on the job psychographs presented on pages 51 and 53.

[4] Viteles, M. S. "Job Specifications and Diagnostic Tests of Job Competency Designed for the Auditing Division of a Street Railway Company." *Psychological Clinic*, 14, 1922, pp. 98-99.

ered and objectively measured in selecting and placing workers on the job under consideration, and which must be considered by a vocational counselor when guiding an individual.

An examination of the two job specifications on pages 50 and 52 shows how the job psychograph is combined with the data on the duties and conditions of the job in a complete job specification. The job psychograph is that part of the job specification which outlines clearly the requirements of the job in the way of special abilities. Its preparation, as the compilation of other facts about the job, requires intensive study of the job by psychologically trained observers, supplemented by the judgment of workers, supervisors, and others thoroughly familiar with the job.

A significant feature of the job psychographic method is the possibility of grouping jobs with similar patterns of abilities so as to simplify both industrial selection and vocational guidance. So, for example, a study of the Railway Auditing Division of The Milwaukee Electric Railway and Light Company, made in 1922, revealed that in the case of seven jobs, differing in duties, the same job psychograph could be employed as a basis for hiring because of the similarity in the underlying pattern of abilities required for success in each.[5]

III
TWO ILLUSTRATIVE APPLICATIONS OF THE JOB PSYCHOGRAPHIC METHOD

This article describes the application of the job psychographic method, developed by Viteles, in the study of two jobs in distinctive industries. The first is that of specking in the textile industry, and the second that of power garment machine operator in the needlework trade. No attempt will be made to discuss in detail the job specifications and job psychographs, since the only purpose in perparing this article is to illustrate the job psychographic method as applied to two activities engaging the research interest of the authors. It is interesting to note that the first of these has been studied in the industrial situation and the second in the vocational training situation.

General Description of the Specking Job. The specking operation in the woolen textile industry has as its purpose the removal of various impurities from woven cloth (white flannel). Most of the foreign matter is eliminated in the cleansing of the wool and the washing of the cloth before the latter reaches the specking tables, but there remain discolored hairs and bits of carbonized vegetable matter and skin which must be taken out with the aid of *burling irons*, which resemble small tweezers. The speckers work in pairs at tables about six feet wide and three feet deep which are pitched at about 15° from the vertical position. The cloth to be specked is fed in a flat piece over the top of the table, and as it is pulled down by the workers it passes into a receptacle below the table.

The grades and types of impurities which must be taken from the cloth vary with the type of material. The determination of just what has to be specked out of the goods is one of the most difficult requirements of the job. In white flannel material, for instance, great care must be taken to remove all carbonized matter, black hairs, and darker brown hairs from the back as well as from the face of the goods while the very light brown hairs may be left in. In working over some of the other cloths, however, it is un-

[5] Viteles, M. S. *The Science of Work.* New York, W. W. Norton, 1934, pp. 81-95.

JOB SPECIFICATION—SPECKER

NAME OF JOB: Specker — NUMBER EMPLOYED: 50
DEPARTMENT: Specking

Symbols: X Essential or Generally — O Desirable or Occasional

DUTIES

1. Removes with burling iron from both sides of cloth all discolored hair and carbonized vegetable matter and skin, roughing up the goods as little as possible in the process.
2. Reports to the supervisor the presence of cloth exceptionally heavily loaded with such foreign matter.
3. Sees that no extraneous dirt or marks of any kind get on the cloth.
4. Places cover over the goods in process at the beginning of lunch period and at the end of working day.
5. Calls supervisor when piece of cloth is finished.

OPERATIONS

Specking the cloth
Wiping the iron
Pulling cloth down
Folding cloth

NATURE AND CONDITIONS OF WORK

Hours: 7-12; 12:30-3:30; *Saturday* off.
Wages: Minimum: $0.35 per hour.

CONDITIONS				MACHINES USED
Standing	O	Permanent	X	Work done at specking table with top surface pitched at about fifteen degrees from vertical.
Sitting	X	Temporary	..	
Walking	..	Routine	X	
Reaching	X	Varied	..	
Noisy	..	Special	..	
Quiet	X	Executive	..	
		Fill-in	..	

TIME TO LEARN AND NATURE OF TRAINING

About 12 days of training. Two days spent with instructor; nine days spent with assistant instructor. Worker then specks alone for a day to gauge proficiency and finally is paired with another worker.

PROMOTION

To: Mending
Spooling

ALLIED JOBS

Sorting

ADVANTAGES

Steady work
Clean work
Conversation with working partner permitted
Usually quiet

DISADVANTAGES

Monotonous
Tiring to the eyes
Local fatigue of fingers and wrist

REMARKS

Work, being clean and not requiring much exertion physically, is looked upon as very desirable by most workers.

QUALIFICATIONS

GENERAL

Sex: Female
Age Limits: 17-35
Age Preferred: 17-30
Race and Nationality: White

PHYSICAL

Height: Medium or over preferred
Weight: Medium
Preferably Right-handed
Vision: Good, normal or corrected

COMPETENCY

Coordination B	5
Visual Discrimination	5
Kinaesthetic Discrimination	5
Kinaesthetic Memory	5
Observation	5
Coordination A	4
Concentration	4
Persistence	4
Visual Memory	4
Observation	4
General Intelligence	

EDUCATIONAL

Schooling		*English*		*Mathematics*		*Special*	
5th grade	O	Correspondence	..	Addition	..		..
8th grade	..	Grammar	..	Subtraction	..		..
High School	..	Spelling	..	Multiplication	..		..
Technical	..	Inquiries	..	Division	..		..
Business	..	Telephone	..	Percentage	..		..
Correspondence	..			Dols. Cts.	..		..
				Decimals	..		
				Fractions	..		

EXPERIENCE

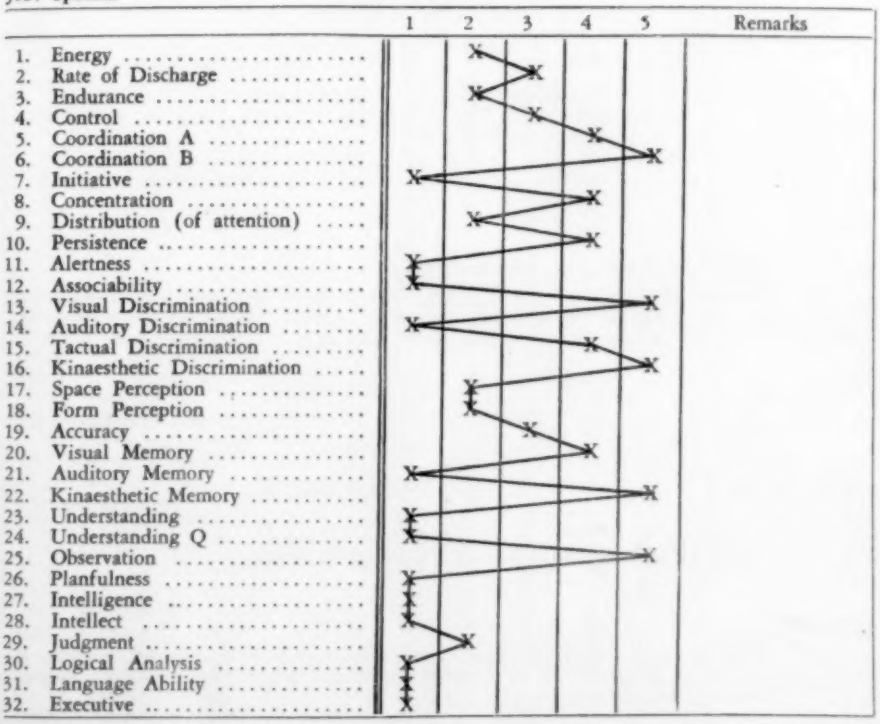
None

TEMPERAMENT

Patience
Persistence
Carefulness
Adaptability to repetitive work

Job: Specker

JOB PSYCHOGRAPH



JOB SPECIFICATION—POWER MACHINE OPERATOR

NAME OF JOB: Power Machine Operator (Garment Machine Operator) Number Employed:

Symbols: X Essential or Generally O Desirable or Occasional

DUTIES

1. Threads machine.
2. Adjusts stitch regulator.
3. Fills bobbin.
4. Replaces broken needle.
5. Checks tension of thread.
6. Makes sure machine is stitching properly.
7. Oils motor.
8. Arranges supply of garment pieces to be stitched.
9. Reports faulty cutting to supervisor.
10. Sews garments according to instructions.
11. Fixes improper stitching rejected by inspector.

OPERATIONS

Starting machine	X	Make various types of seams		Handling material	
Stopping machine	X			Folding	X
Regulating speed	X			Creasing	X
				Tucking	X

NATURE AND CONDITIONS OF WORK

Hours: (At present the hours of work are governed by the Code under which the industry is working—40-hour week.)

Wages: Minimum $9.75 for 8-week learning period, $13.75 for Experienced Operators. Piece work allows Operators to earn more than the minimum.

CONDITIONS				MACHINES USED	
Standing	..	Permanent	X	Single Needle Lock Stitch	X
Sitting	X	Temporary	..	Single Needle Chain Stitch	X
Walking	..	Routine	X		
Reaching	O	Varied	O	Special machines are usually operated by special operators.	
Noisy	O	Special	..		
Quiet	O	Executive	..		
		Fill-in	..		

TIME TO LEARN AND NATURE OF TRAINING

The Cotton Textile Code allows a learning period of eight weeks. The time to learn varies with the experience and ability of the operator; should be a good operator in six months; can become a fair operator in three months. Trade School training is valuable.

PROMOTION

No definite plan

ALLIED JOBS

Work on special machines such as Button Hole Machine, Sleever

ADVANTAGES

Steady work
Clean work
Some opportunity for promotion to special machines

DISADVANTAGES

Requires careful application
Must work at a fast rate
Seasonal in some firms

REMARKS

The type of garment upon which the operator works determines the quality of the work, for cheap garments speed of production is essential, for better grade garments both speed and quality workmanship are demanded.

QUALIFICATIONS

GENERAL

Sex: Female preferred
Age Limits: 18-50
Preferred Age: 18-30
Race and Nationality: No limitations

PHYSICAL

Height:
Weight:
Use of both hands
Vision: Normal or corrected

COMPETENCY

Coordination A	4
Coordination B	5
Visual Discrimination	4
Space Perception	4

General Intelligence
Minimum M. A. 8 yrs.

EDUCATIONAL

Schooling		*English*		*Mathematics*		*Special*	
5th grade	O	Correspondence	..	Addition	X		..
8th grade	..	Grammar	..	Subtraction	X		..
High School	..	Spelling	..	Multiplication	..		..
Technical	..	Inquiries	..	Division	..		..
Business	..	Telephone	..	Percentage	..		..
Correspondence	..	Speaking	O	Dols. Cts.	..		..
				Decimals	..		
				Fractions	..		

TEMPERAMENT

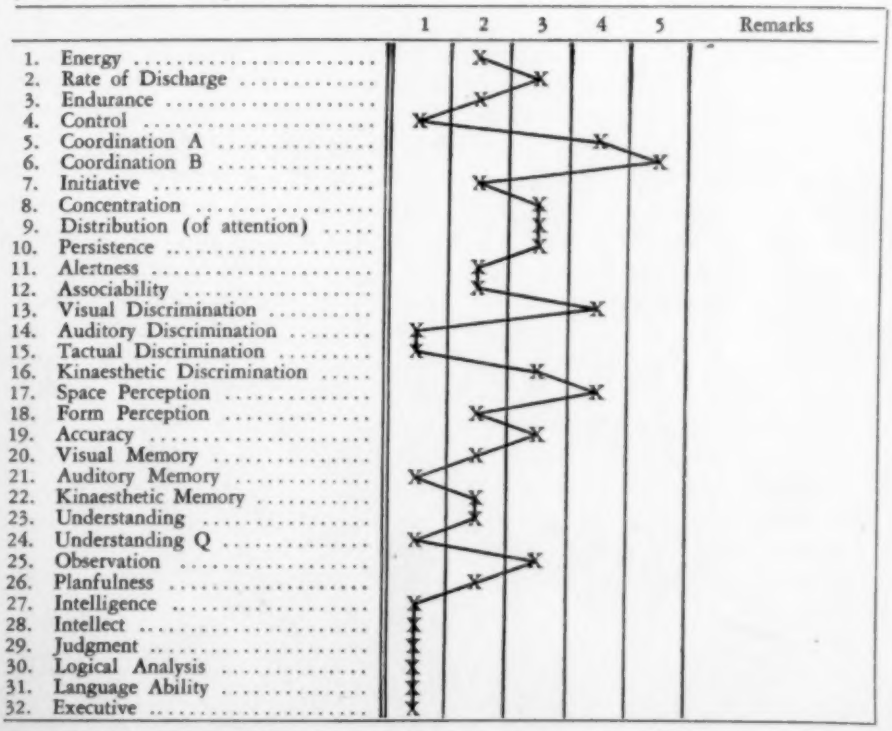
Must be cooperative in working as member of group when team work is employed. Adaptability to repetitive work.

EXPERIENCE

No experience is required where firms train. Trade school training, dressmaking experience is helpful. At present most firms demand experienced operators.

JOB PSYCHOGRAPH

Job: Power Machine Operator



necessary to remove any but the darkest hairs, which would stand out over the final color of the material, and the carbon. In the range between these two extremes the workers must apply various standards in the selection of the specks which they are to eliminate. Since both sides of the material are gone over it is necessary, in addition, to keep in mind that on the back of the cloth the standards need not be as exacting as on its face.

The speckers stand or sit before the cloth and remove the specks with strokes of the burling irons, which are held between the thumb and first or second finger. The specking is done by striking at the foreign matter with short, rapid strokes, the points of the irons being snapped shut at each contact. As the impurities are removed from the cloth they are wiped from the irons upon a pad pinned to the worker's waist front. The hair or carbon is sometimes imbedded rather deeply in the cloth so that it is necessary to speck through some of the cloth before it can be brought to the surface. Here great delicacy of touch is required to avoid making a hole through the material. As soon as one piece of cloth has been specked another is brought to the table and the work goes on.

General Description of Power Garment Machine Operating. Power machine operating consists in controlling a sewing machine run by electric power. After the cutter has prepared the cloth it is the duty of the operator to sew it together. In some establishments one operator sews the entire garment; in other establishments operators are organized into teams, each operator in a team working on one particular part of the garment. This division of work requires less knowledge and skill than when the operator completes the entire garment.

IV

THE PSYCHOGRAPHIC METHOD IN RELATION TO OTHER METHODS

The job psychographic method is based upon a subjective analysis of the mental requirements of a job. This has been supplemented by the more objective techniques of describing job qualifications in terms of aptitude tests used in predicting proficiency on the job. This method, elaborated in the recent work of Trabue [6] and Hull [7], and early advocated by Link, "makes a thoroughgoing analysis of one job and then, on the basis of this study, selects a set of tests which seems to involve the same ability as that required by the job. These tests are then tried out on a larger number of workers whose ability is known in order to find those tests which do this to the highest degree. When tests which are sufficiently significant are found, the result is a standard and scientifically accurate measurement of those specific abilities which are required by that specific job." [8]

The use of test scores in indicating requirements for job success is an objective method which has much to recommend it. However, at the present time the jobs for which adequate test batteries have been developed, and for which an objective statement of qualifications in terms of test scores can be made, are few in number. For this reason a systematic subjective analysis and statement of qualifications for the job, by means of the job psychographic method described above, may serve as a useful procedure in job analysis.

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[6] Trabue, M. R., "Occupational Ability Patterns." *Personnel Journal*, 11, 1933.

[7] Hull, Clark L., *Aptitude Testing*. World Book Co., Yonkers-on-Hudson, N. Y., 1928, p. 535.

[8] Link, Henry Charles, *Employment Psychology*. Macmillan, New York, 1919, p. 259.

INTELLIGENCE AND OCCUPATIONAL ADJUSTMENT

DOUGLAS FRYER *and* E. J. SPARLING

MOST PEOPLE today think of intelligence as being necessary for success in most occupations. This conception does not originate with the introduction of intelligence tests although the tests have given the problem of occupational adjustment a quantitative definition. With the exception of a try-out in the occupation itself, the general intelligence test is by far the best single predictive measure of success in an occupation. But there are pitfalls in the use of intelligence test scores and occupational intelligence norms, which should be borne in mind by all those concerned with giving "advice" in occupational adjustment.

II
BACKGROUND INFORMATION

The implication that the operations of an occupation require a certain level or grade of intelligence and that intelligence tests measure this grade is not exactly correct. Herein lie a great many errors in the use of the intelligence test score as a measure of possible adjustment. The intelligence test is a measure of what the individual has learned, from which can be predicted his capacity to learn in the future. Because of the general nature of problems included in the intelligence test, the score made by an individual indicates a level of general learning accomplishment, which can be stated in terms of its relation to the average of all the individuals upon whose scores the test was standardized. Prediction of occupational adjustment from the intelligence test score should be made in approximately the following terms: There is a certain capacity to learn other tasks similar to those which have been learned in the test, and such as are inherent in varying degrees in the occupations. But prediction of occupational success from intelligence test scores is seldom made in this manner.

Turning to the occupational side of the problem of predicting possible adjustment in the occupation from the intelligence test score we find that distributions of test scores are secured for this purpose for workers in various occupations and used as norms of occupational success. Different conditions govern the continuation of workers in these occupations. Some are retained through "pull" with the foreman, or higher official, in spite of the fact that their work may be inferior to that considered satisfactory. (Local conditions determine what is considered satisfactory for the retention of an employe.) Some are given greater opportunity to learn the tasks of the occupation before being discharged as unsatisfactory. Once the tasks of the occupation are learned and the processes automatized there is very little opportunity in many occupations for the expression of intelligence. To allow the length of the training period to vary for different individuals in an occupation often makes it possible for individuals of var-

CHART I

CORRESPONDING INTELLIGENCE—AC

ACHIEVEMENT LEVELS	Intelligence Groups	A Very Superior 18.0 up Mental Age	B Superior 16.5 to 17.9 Mental Age	C+ High Average 15.0 to 16.4 Mental Age	C Average 13.0 to 14.9 Mental Age (Estimated Average Mental A
	GENERAL	Intelligence for creative and directive effort	Intelligence for executive, business, leadership, and most professional endeavor	Intelligence for *minor* executive and leadership positions Excellent capacity for abstract detailed and highly skilled mechanical work	Intelligence for routine and skilled mec Rarely capable of complicated abstract
		High professional occupational level	*Professional occupational level*	*Technical occupational level*	*Skilled occupational level*
	EDUCATIONAL	Ability for superior (honor) record in university	Ability for an average college record	Ability for secondary school graduation and some college training	Ability for elementary school graduation school training
	OCCUPATIONAL (EXPECTED SUCCESS AS)	Editor Lawyer Teacher (College) Engineer (M., E., and C.) Diplomat Minister Salesman (Technical) Statistician Teacher (High school) Accountant Executive (Business)	Writer (Journalist) Physician Teacher (Elementary school) Salesman (Insurance) Business man (Large merchant and banker) Chemist Private secretary Office manager Factory superintendent Draftsman Buyer Social worker Dentist Correspondent Minor executive (Business)	Stenographer Bookkeeper Nurse Office clerk Bank clerk Salesman (Wholesale) Business man (Small merchant) Railroad clerk Teacher (Gymnasium) (Elocution) (Music) (Domestic science) Traffic clerk Photographer Telegrapher Radio operator Conductor (R. R.) Musician (Band) Sign letterer Postal clerk Truckmaster Electrician Foreman (Construction) Stock clerk Shipping clerk Express clerk Druggist Foreman (Factory) Graphotype operator Typist File clerk	Engineman (Locomotive) Farrier Telephone operator Stock checker Handyman (General mechanic) Policeman Auto assembler Engineman (Marine) Riveter (Hand) Tool and die maker Auto engine mechanic Laundryman Gunsmith Plumber Pipefitter Lathe hand (Production) Auto mechanic (General) Auto chauffeur Tailor Dressmaker Millwr Lineman Machinist (General) Motorcyclist Brakeman (R. R. Actor (Vaudeville) Butcher Fireman (Locomotive) Blacksmith (General) Shop mechanic (Railroad) Printer Carpenter (General) Motorman (Street car) Conductor (Street car) Baker Cook Miner, drill runner Painter

CHART I

LLIGENCE—ACHIEVEMENT VALUES

C Average 13.0 to 14.9 Mental Age (Average Mental Age: 13.75)	C— Low Average 11.0 to 12.9 Mental Age	D Inferior 9.5 to 10.9 Mental Age	D— Very Inferior 7.0 to 9.4 Mental Age	E Useless 0.0 to 6.9 Mental Age
routine and skilled mechanical work complicated abstract detailed work *level*	Intelligence for some skilled routine work *Semi-skilled and low-skilled occupational level*	Intelligence for *simple* routine work only Requires unusual amount of supervision; unable to understand written directions *Unskilled occupational level*	Intelligence for *very simple* routine work only Lacks self direction entirely *Lowest unskilled occupational level*	Intelligence for no social effort Sometimes possible for high grade imbeciles to do *very simple* routine tasks under very careful supervision
ry school graduation and some secondary	Ability rarely sufficient for elementary school graduation	Ability limited so that individual usually drops out of elementary school before fifth grade	Ability limited so that individual is rarely capable of advancement beyond third grade elementary school	Ability limited so that individual is rarely capable of making any advancement in elementary school. May be able to do manual work usually offered in kindergarten
Milliner Lineman Machinist (General) Motorcyclist Brakeman (R. R.) Actor (Vaudeville) Butcher Fireman (Locomotive) Blacksmith (General) Shop mechanic (Railroad) Printer Carpenter (General) Motorman (Street car) Conductor (Street car) Baker Cook Mine drill runner Painter Concrete worker Farmer Auto truck chauffeur Bricklayer Caterer Horse trainer Cobbler Engineman (Stationary) Barber Hairdresser Sales clerk Horse hostler Horse shoer Storekeeper (Factory) Aeroplane worker Boilermaker (General) Rigger Teamster Miner (General) Waiter Station agent (General)	Hospital attendant Mason Lumberman Watchman Shoemaker Sailor Structural steel worker Canvas worker Leather worker Packer Fireman (Stationary) Porter Textile worker Sheet metal worker Laborer (Construction) Domestic servant Laborer (Factory)	Fisherman Laborer (Unskilled) Loader Lifter	Laborer (Simplest work)	No occupation

ious levels of intelligence to learn the same tasks equally well. It has been demonstrated that if sufficient time is allowed even the feeble-minded can master occupational tasks not ordinarily open to them under the usual time limits of apprenticeship. Again, altering the usual motivation for learning occupational tasks changes the situation. A business firm may offer bonuses to those in their apprenticed group for learning the tasks of an occupation within a certain period. In all these ways the intelligence distribution of an occupation may be influenced so that it does not represent the *usual* demands upon intelligence.

Prediction from the intelligence test score is a prediction of capacity to learn the tasks. The intelligence test indicates learning possibilities rather than occupational efficiency. Occupational success does not depend alone upon intelligence. It is found that as the social status of the occupation increases the average of intelligence scores of the workers tends to be higher. There is an impressive correlation between the two factors. But when the two factors, intelligence of workers and success of workers within a given occupation, are compared the correlation between them is not so impressive. Other human factors, such as industry, drive, and personality, play their part in success. The best prediction from the intelligence tests is one of capacity to learn the tasks of an occupation, and the intelligence scores of those who are successful in learning the tasks of the occupation under *usual* conditions is an occupational norm for the prediction of this adjustment.

More specifically, the general intelligence test predicts a capacity to learn such tasks as have been learned and measured by the intelligence test. Not all the different tasks which an individual may need to learn are represented in the general intelligence test. This is true of social learning and particularly so of mechanical learning. While mechanical and social intelligence tests do not show a higher prediction of success than does the abstract general intelligence test, the prediction of occupational success from the general intelligence test score varies in inverse proportion to the differences between the test tasks and the occupational tasks.

This affects the prediction of success from occupational intelligence norms for occupations such as that of mechanic, electrician, carpenter, and lathe operator. Prediction here is not as accurate as with the occupations which largely include tasks involving mathematics and language, such as that of clerk, secretary, and lawyer. But there is some value in this prediction, for almost every occupation involves the use of abstract tools. So too with the more social occupations, such as retail selling and canvassing, and that of the insurance agent. The prediction is valuable in so far as the occupation involves learning similar to that measured in the general intelligence test.

III

MINIMUM CRITICAL SCORES OF OCCUPATIONAL SUCCESS

One of the most efficient methods of selecting employes is to establish a minimum critical score in intelligence to indicate the level below which learning of the occupational tasks is slower than is consistent with the practices of the business firm. Depression conditions have emphasized the need for such norms of selection. These methods cut down the cost of training. Minimum critical scores have been established for numerous occupations, mostly in the clerical

field as would be expected, and with various intelligence tests.

The procedure calls for a distribution of the applicants in intelligence and according to some measure of success. Let us assume that we are establishing a minimum critical score for typists and that a certain number of typed pages a day is a measure of success. The distribution of applicants according to intelligence and success might be somewhat as follows in Table I.

TABLE I

HYPOTHETICAL DISTRIBUTION OF INTELLIGENCE SCORES OF APPLICANTS WITH PER CENT SUCCESSFUL AS TYPISTS

Test scores	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
No. of cases	4	7	6	5	4	7	9	11	12	4	10	12	14	9	6	4	2	1	1	1
% Successful	0	29	33	0	25	71	81	100	83	100	100	83	72	100	75	50	50	0	100	0

Here, the test score of 45 appears to be a minimum critical score for typists. Below this score a high percentage of those applying are not able to come up to the occupational standard of typing, and above this score there is a high percentage of success.

Such results as these might lead a business firm to adopt a minimum occupational intelligence norm and not employ individuals who are below the critical score. In this way training costs would be reduced by not having to train those who are less likely to be successful.

An illustration of the use of critical scores is offered in the results of a testing program of a large tire manufacturing plant by Scott and Clothier.[1] Critical norms for various occupations are offered in scores of the Scott Mental Alertness Test and are shown in Table II with corresponding Army Alpha and Stanford Binet equivalents.[2] Scott and Clothier define the "critical score" in this instance as "the score below which almost no one succeeds in that particular occupation."

The relation of the average score of the workers in an occupation in which they are considered to be successfully adjusted to the critical score of these workers is indicated in Table II. In general the average score of an occupational group is a good indication of the intelligence requirements of the occupation, but it is shown here that industry can benefit by employing workers who are definitely below the general average of those who gravitate into the occupations.[3]

IV
MAXIMUM INTELLIGENCE LEVELS OF ADJUSTMENT

The problem of maximum intelligence levels has not been dealt with very generally because of the difficulties of col-

[1] Scott, W. D., and Clothier, R. C. *Personnel Administration.* Shaw, Chicago, 1923, pp. 241-5.

[2] The authors have in preparation corresponding intelligence scores for the Stanford-Binet, Army Alpha, Corporation Alpha (revision), Business Alpha, Well's Alpha (revision), Scott Mental Alertness, Test VI Bureau of Personnel Research, Pressey Classification, Otis Self-Administering, Otis General Intelligence, National Institute Series 33, Pond Alpha-Beta (revision), which will be published at a later date.

[3] One of the reasons why the average intelligence score of an occupational group tends to be higher than the critical score adopted by various firms, or higher than the score considered to be necessary for successful work in the occupation, is the preponderance of occupations in society which require only intelligence levels which are below those of the average of the general population.

TABLE II

CRITICAL OCCUPATIONAL INTELLIGENCE STANDARDS IN A LARGE TIRE MANUFACTURING COMPANY. (Adapted from Scott and Clothier, pp. 242-3.)

	Mental Alertness		Army Alpha		Stanford-Binet			
	Average	Critical	Average	Critical	Average M.A.		Critical M.A.	
WOMEN	Score	Score	Score	Score	Yrs.	Mos.	Yrs.	Mos.
Stenographers	44	35	111	91	16	10	15	10
Typists	43	33	108	86	16	8	15	7
Comptometer operators	39	27	90	65	15	10	14	1
Clerks	38	23	89	57	15	9	13	7
MEN								
Factory school instructors	62	50	156	126	18	10	17	6
Chemical engineers and chemists	61	45	153	113	18	7	16	11
Engineers other than chemical	57	40	142	102	18	3	16	6
Draftsmen	49	35	123	91	17	5	15	10
Clerks	46	30	116	78	17	1	15	..
Dispatch clerks	43	30	108	78	16	9	15	..
Inspectors and shift foremen	43	23	108	57	16	9	13	7
Messenger and mail boys	25	15	61	38	13	10	12	5

lecting data upon maximum critical scores. But in the use of distributions of intelligence of occupational groups for selection and guidance it has been generally assumed that the seventy-fifth percentile (Q^3) of the distribution is a point beyond which there is likely to be maladjustment, for reasons such as waste of abilities, dissatisfaction with social position and progress, and lack of interest and motivation in the tasks of the occupation.

A glance at the distribution in Table I shows a falling off in the percentage of successful applicants in the upper scores of the intelligence test. Such evidence as this has led to the conception of a maximum intelligence score for occupational success. Here, the maximum critical score might be taken as 54 and the range for the employment of typists from 45 to 54. This is all hypothetical, of course. But it is believed by many industrial psychologists, and there is considerable evidence for it, that those with high intelligence scores in an occupation where the average is distinctly lower are more likely to be dissatisfied. In addition, these workers are frequently found to be less efficient in routine tasks. The assumption of a maximum critical score is often made in industry and individuals above this score are not employed.

V

THE USE OF MINIMUM STANDARDS FOR VOCATIONAL GUIDANCE

Minimum standards of occupational intelligence are particularly useful in special vocational guidance situations such as in the training and placement of subnormals in industry. Extensive investigations into the intelligence requirements of women's occupations has been carried on in the Vocational Adjustment Bureau of New York City under the direction of Emily T. Burr[4] with the purpose of establishing minimum levels at which girls below the mental age of twelve may be considered vocationally adjusted, or will have some probability of success in

[4] See *Minimum Mental Age Levels of Accomplishment* by E. W. Unger and E. T. Burr, Univ. of the State of N. Y., 1931, pp. 108, for a recent report of these investigations.

TABLE III

MINIMUM INTELLIGENCE LEVELS FOR WOMEN'S OCCUPATIONS

(Adapted from Unger and Burr.)

Occupations	Minimum Mental Age
Packing	5 years
Miscellaneous light factory work	6 years
Assembling, errand girl, examining, pasting	7 years
Cutting, folding, garment machine operating	8 years
Hand sewing, press operating, filing, stock girl	9 years
Clerical work	10 years
Selling	11 years

an occupation. A wide distribution of intelligence is found for all of the occupational groups investigated. But a definite minimum intelligence level, where a large proportion of the placements of girls are usually successful in the operations of the job is established for the occupations in Table III.

In establishing these minimum intelligence levels, it is pointed out that they are for the purpose of guiding the subnormal girl in the selection of a vocation in which she may be successful. It is said that "To generalize that any and all applicants of a retarded mental development of five years can be sent to a packing job is to invite disaster." There are numerous personality factors, especially among subnormal girls, which influence success in a large measure. Higher intelligence levels than those selected as the minimum standard often show a slightly greater percentage of successful workers.

VI
GENERAL OCCUPATIONAL STANDARDS

The large mass of the available intelligence distributions of the occupations was collected in the United States Army during the World War when about two million civilian draftees were examined with various intelligence tests, including the historically famous Army Alpha.[5] These distributions were revised and published by the senior author.[6] They were reproduced in the form of a chart[7] (Chart I) in which general, educational, and occupational achievement is related to intelligence levels. This chart illustrates the use to which such standards can be applied in the problems of adjustment.

In the years which have followed these early publications (since 1924) a few intelligence distributions of occupations have been published[8] and numerous others are in the files of various industrial institutions. Occupational intelligence distributions, such as these, indicate adjustment expectancy and are probably of more value as information for guidance purposes than are the critical scores of individual industries, which, on the other hand, may be more accurate in the selection of workers in the local situation.

The authors are now working upon a complete assembling of all such distributions with the purpose of indicating the

[5] "Psychological Examining in the United States Army," Vol. XV, *Memoirs of the National Academy of Science*. G. P. O., 1921, pp. 819-52.

[6] Fryer, Douglas. "Occupational-Intelligence Standards." *School and Society*, XVI, 1922, pp. 273-7.

[7] Fryer, Douglas. *Vocational Self-Guidance*. Lippincott, 1925, opposite p. 72.

[8] See for illustration: Pond, M. "Occupations, Intelligence, Age, and Schooling." *Personnel Journal*, XI, 1932-1933, pp. 372-382.

Bregman, E. O. "The Performance of Student Nurses on Tests of Intelligence." *Nursing Education Bulletin*, New Series, II, March, 1933, pp. 32.

Diehl, H. S., Paterson, D. G., Dvorak, B. J., Longshaff, H. P. "A Personnel Study of Duluth Policemen." *University of Minnesota Employment Stabilization Institute*, II, 2, 1933, pp. 25.

general country-wide situation. Psychologists and research workers in industry have contributed unpublished distributions for this purpose and the table on the next page (Table IV) is formed from data collected by Norma Bird in four specialized clerical occupations. The distributions for each of these clerical occupations are for women workers.

Slight sex differences in intelligence are found for women and for men workers. Where both sexes work in the same occupations, distributions of the intelligence of men and of women should be considered separately.

Among the four clerical occupations in Table IV differences in the intelligence of the workers are evident. There is considerable overlapping of the distributions, as would be expected. The differences among these four occupations are noted at the quartiles as well as at the median scores. Stenographers tend to be higher on the scale of intelligence than ledger clerks, and ledger clerks higher than typists, and so on. Occupations in the clerical field would not be expected to show large differences in intelligence, but they are present to a degree which would seem to be valuable in guidance.

Contrasted with these distributions of the clerical occupations, which are somewhat above the middle of the distribution of intelligence of the population at large, are other occupations where workers are much higher and much lower upon the scale of intelligence. Table V is formed from data collected by the Psychological Corporation in two specialized insurance occupations, where the distributions of intelligence are very much higher than those for the clerical occupations. These distributions are for men *executives* and *life insurance salesmen*. Q_1 of a combined distribution of these two insurance occupations would approximate Q_3 of a combined distribution of the clerical occupations, which indicates the great difference in intelligence of the workers in these two occupational fields.

Perhaps the most suggestive for guidance purposes of the occupational differences are the score ranges of the middle 50 per cent of the workers in various occupations. The middle 50 per cent of the distributions, which is Q_1 to Q_3, represents the range of preferable adjustments. This is a usual assumption in guidance. Minimum critical scores indicate that successful intelligence adjustment may frequently be at a lower score than the first quartile, but a distribution of the scores of the middle 50 per cent in the occupations shows what is the usual situation. The highest score and the lowest score signify the extreme scattering of intelligence scores among workers who are able to keep their jobs in the occupation.

It is probable that the lower 25 per cent of the distribution should be eliminated from consideration in the use of such material for the prediction of occupational adjustment. Most occupations include hangers-on who are unqualified.

VII
CRITICISM OF GENERAL OCCUPATIONAL STANDARDS

There are psychologists who would argue that distributions of intelligence scores for the various occupations are of little or no value as occupational intelligence norms because these distributions overlap to such a high degree. This overlapping is especially evident in the distributions collected in the United States Army. It is due to many causes, some of which have already been mentioned. But the majority of psychologists would

TABLE IV

INTELLIGENCE DISTRIBUTIONS OF WOMEN'S OCCUPATIONS IN THE CLERICAL FIELD

(Contributed by Norma Bird. Scores are in Army Alpha terms. In the parentheses are the mental age equivalents.)

Occupations	No. in Group	Lowest Score	Q_1	Median	Q_3	Highest Score
Stenographers	100	43 (12 yrs., 8 mos.)	83 (15 yrs., 5 mos.)	97 (16 yrs., 2 mos.)	110 (16 yrs., 10 mos.)	136 (18 yrs.)
Ledger clerks	219	30 (11 yrs., 10 mos.)	78 (15 yrs.)	93 (16 yrs.)	110 (16 yrs., 10 mos.)	156 (18 yrs., 10 mos.)
Typists	100	43 (12 yrs., 8 mos.)	65 (14 yrs., 1 mo.)	88 (15 yrs., 8 mos.)	97 (16 yrs., 2 mos.)	129 (17 yrs., 8 mos.)
File clerks	80	27 (11 yrs., 6 mos.)	55 (13 yrs., 6 mos.)	76 (14 yrs., 10 mos.)	85 (15 yrs., 6 mos.)	134 (17 yrs., 11 mos.)

prefer to speak of tendencies. A large part of the total range of human differences in intelligence is represented in a distribution of intelligence of the workers in all occupations. The individual who is superior in intelligence would undoubtedly find a better adjustment in the occupations showing the highest averages; the individual who is inferior would be unable to do the work or learn the tasks of these occupations. It is possible for inferior individuals, that is, those with the lower scores in the intelligence distribution for a certain occupation, to make a satisfactory adjustment because of other human qualities necessary to that adjustment. Also, because of other deficiencies, an individual who is qualified in the requirements in intelligence may be a failure, while the inferior individual may be successful.

During the early days of use of intelligence tests in industry some wished to use intelligence scores as if they were measures of all requirements for success. Those days of enthusiasm are over and there is an atmosphere of caution in the use of intelligence test scores. There are, of course, other qualities which make for success, but when all is said about the problem, the most probable score of workers in an occupation (the average of a distribution) is the best single predictive measure of success that is available for purposes of vocational guidance.

TABLE V

INTELLIGENCE DISTRIBUTIONS OF MEN'S INSURANCE OCCUPATIONS

(Contributed by Psychological Corporation. Scores are in Army Alpha terms. In the parentheses are the mental age equivalents.)

	Lowest Score	Q_1	Median	Q_3	Highest Score
Executives	88 (15 yrs., 8 mos.)	119 (17 yrs., 4 mos.)	138 (18 yrs., 1 mo.)	159 (18 yrs., 11 mos.)	187 (19 yrs., 6 mos.)
Salesmen (Life)	60 (13 yrs., 10 mos.)	102 (16 yrs., 6 mos.)	125 (17 yrs., 6 mos.)	140 (18 yrs., 2 mos.)	172 (19 yrs., 4 mos.)

OCCUPATIONAL ANALYSIS FOR VOCATIONAL GUIDANCE

Methods Used by the National Institute of Industrial Psychology

M. BOOLE STOTT *and* M. BIRKINSHAW

DURING the past three years an intensive occupation analysis of three important careers for women—secretarial work, secondary school teaching, and nursing—has been in progress. A large number of questionaires have been circulated among women engaged in these three professions. The original purpose was (1) to get from them detailed information about the work that would enable the Institute's investigators to carry out the analysis, and (2) to obtain some information regarding the temperamental features, experience, and environment of the persons actually engaged in the work, and some understanding of the differences between those who felt that their choice of career had been wise and those who did not.

With reference to the particular occupation, questions were asked regarding duties, qualifications, liking for the work, previous experience, reasons for choosing the occupation, preferences, progress, and aspirations. A section of the questionaire was also concerned with more purely personal matters such as education, school life, outside interests and hobbies, physical condition, family history, and environment.

The object was not merely to ascertain the features common to those engaged in any one profession, but also the differences among those engaged in its various branches—for example, secretaries in schools, in commercial offices, or in newspaper offices.

Every individual completing the questionaire was asked whether she would be willing to give an interview if desired, and where practicable the written report was followed by a personal interview. This gave the investigator an opportunity to clear up any points which did not appear clear from the written answers, to add certain supplementary questions which seemed to be called for in particular cases or circumstances, to check up her own previous estimate of the individual's temperamental qualities, and to add certain questions about private life and emotional experiences which it had been considered unwise because of their personal nature to include in the questionaire.

II

DIFFICULTIES INVOLVED IN THE METHOD

1. *Lack of cooperation.* To obtain even the minimum amount of information on which any analysis could be based, or any picture of the individual, it was found necessary to make the questionaire long and cumbersome, with the result that a comparatively small number of replies were received. This was found true especially of the secretarial career.

2. *Failure to understand the questions.* The questions were not always understood in the sense in which they were intended, and the answers given consequently appeared irrelevant or incomprehensible. This was especially so in the

case of secretaries, owing no doubt to two main causes:—

(a) The lower average level of intelligence and the lesser knowledge of psychological terms;

(b) The fact that the secretarial questionaire, devised and circulated first, was not found to be carefully enough worded. This difficulty was remedied in other investigations.

3. *Inadequacy of information.* This was found especially in the answers to the questions regarding duties in the secretarial and nursing questionaires. Because of the length of the questionaires it was not considered practicable to furnish, for the individuals to check off, a list of possible duties involved in their work. They were merely asked to give as detailed a list of duties as possible, though in the nursing questionaire (which was issued after some experience had been gained from the secretarial one) rather more definite guiding lines were given. The responses received were usually very vague, including such items as "correspondence," "balance sheets," "work connected with committee meetings," etc. Often no attempt was made to say what was done with regard to the correspondence, balance sheets, or committees. The fact was overlooked that both the general manager and the office boy deal with correspondence, each in his own way.

The question regarding the reason for choosing the career was also often inadequately and vaguely answered. The usual response was, "Because I thought I would like it." "Because I had to earn my living" was sometimes given as the reason, as if the question had been, "Why did you go to work at all?" By teachers this was given usually only as one of several reasons and not as the sole reason.

4. *Difficulty of distinguishing differences between posts and differences between individuals.* With the enormous variety of posts available in the secretarial profession, and the inadequate information given about the work—scarcely any two questionaires were received from people in really similar work—it was found impossible to decide whether differences in the individuals' reactions toward their posts were really due to differences among the posts or to differences among the people. Two people in apparently similar work would, for instance, make entirely contradictory statements about it, and while the differences doubtless lay largely in the temperaments of the individuals involved, it remains true that no adequate occupation analysis is possible unless one has either:—

(a) Much more detailed information than was usually given about the duties involved, or

(b) A sufficiently large number of replies from people in very similar work to obtain a general average.

5. *Subjective nature of the analysis.* The ultimate analysis of the occupation must, of necessity, be somewhat subjective, and liable to the influence of opinions, and perhaps to some extent the preconceived opinions, of the investigator concerned. This subjective factor applies particularly to the temperamental estimates by the investigator, whether based on the questionaire alone or on this and an interview. An attempt to meet this difficulty was made in the nursing investigation by obtaining, when possible, a temperamental estimate from the matron or sister tutor of the hospital where the nurse was working.

III
VALUE AND LIMITATIONS OF THE METHOD

The chief value of circulating questionaires to workers in an occupation is

that a large number of people can be reached with small expenditure of time or money. This value is, however, considerably reduced by the failure to reply on the part of a large number of those to whom it is sent. The actual proportion of those who reply varies considerably with different careers. By such a method, too, it is often possible to obtain much more detailed information regarding the duties involved in an occupation than is to be gained in any other way. Also, it is possible to get information regarding the temperamental qualities which make for happiness or unhappiness, success or failure, in the work concerned.

1. *Selective group.* The questionaire necessarily acts as a selective factor. The number of persons willing and able to respond to a long questionaire is limited. It is probable that the general picture of contentment or discontentment that might be obtained, were all to complete the questionaire, would be very different from that actually produced. The group replying is, of course, more highly selected in careers in which the percentage of replies is especially low.

In this connection it must be remembered that the greater the homogeneity of the group concerned, the less selective is likely to be the action of the questionaire. Teachers, a highly selected and homogeneous group, are an illustration.

A shorter supplementary questionaire was subsequently sent to those teachers who had failed to reply to the first one. This form asked merely why they had failed to reply, and the degree of satisfaction they felt with their work. A fairly adequate response was received to this shorter form. The information was not sufficient for the purposes of occupation analysis, but it is hoped to ascertain from it the extent to which the group replying to the first questionaire is representative of teachers as a whole.

2. *Ignorance of efficiency.* In the case of secretaries the only criterion of suitability for the work is the individual's expressed satisfaction with her post. For teachers various objective data such as seniority of position, stage of progress, etc., as well as a certain number of anonymous reports from colleagues, were available. For secretaries, engaged as they are in individual posts, it would have been necessary to obtain special reports from each employer, and even had permission for this been given by the employe (and it would certainly have been refused in many cases) no definite comparison between individuals could have been made. For nurses it was possible to obtain some information, as in the case of temperament, from their matrons or sister tutors.

3. *Absence of knowledge of general or special abilities.* Only by giving tests similar to those used in vocational guidance can any really adequate knowledge of the intelligence and special abilities of the individuals engaged in the occupations be obtained. The questionaire method is limited to information about interests and temperamental factors.

In the nursing investigation a group test of intelligence was given to as many individuals as possible and a remarkable degree of correspondence was found between the test scores and the position in nursing examinations. This correspondence did not, however, extend to practical efficiency.

The method of circulating questionaires to workers, in spite of obvious limitations, is almost the only method of obtaining the desired information about certain occupations.

The value of the questionaire method appears to increase with:—

1. The higher general level of intelligence and education of the group concerned.

2. The greater homogeneity of the group.

3. The greater extent of group consciousness. In a group with a strong group consciousness, with centralized associations whose cooperation can be enlisted, a more adequate response is likely to be found, and much valuable supplementary information can be obtained.

4. The greater centralization of authority over large groups of workers. In institutions in which large groups of workers are employed in a similar capacity, cooperation can be obtained through the medium of the heads or supervisors. Where a friendly spirit exists between those in authority and the workers themselves the cooperation may be considerable and make further information available.

IV

METHODS OF ANALYSIS AND ULTIMATE AIM

The method of analyzing the occupation after receipt of the questionaire varies with different investigators. The tentative scheme of classification (Form A, shown herewith) based upon the temperamental qualities and the emotional make-ups which may be satisfied in the careers concerned, and into which it may be hoped to fit all professional and business occupations, may be of interest.

At present all questionaires received from secretaries are tentatively fitted into this scheme by the investigator's putting a tick on the appropriate line. While the investigator's opinion as to where the ticks should be placed does not always seem to agree with the remarks of the secretaries in the questionaires, it has been found (in the cases of those interviewed) that the workers themselves usually agree with the classification of the investigator where this has been shown to them and the exact meaning of the phrases explained.

While a tabulation of occupations according to this or a similar scheme seems desirable it is obviously insufficient as a complete account of the occupation. A form has been suggested for such an account. On the obverse side are included the following items:—

Occupation—*e. g.*, journalism
Branch—*e. g.*, whether editor, reporter, etc.
Work
General Description of Type—*e. g.*, indoor or outdoor; active or sedentary; dealing with people, things, or ideas; and in general all the main features as shown in the tabulated classification (Form A)
Requirements (with contra indications)—
  Physical
  Psychological:
    General intelligence level
    Special abilities
    Temperament
  Interests
  Education:
    General
    Special training
  Knowledge:
    Essential
    Useful

On the reverse side of the form appear the following items:—

Conditions—*e. g.*, resident or not; hours, holidays; special features
Prospects—frequency of posts and possibilities of future progress
Salaries
Mode of entry—*i. e.*, how to get into it
Notes
Associations connected with it
References—*e. g.*, to articles about career

FORM A

CLASSIFICATION OF OCCUPATIONS			*Illustrative Examples of Careers Which are Outstanding in each of the Features Described* GENERAL TYPE OF POST
Active outdoor			Farming, gardening, etc.
indoor			Domestic work, nursing, etc.
Sedentary			Typing, bookkeeping, librarianship
Creative, original work			Journalism, architecture, art, scientific research
Giving scope for self-expression and development			Social work, medicine (G. P.), organizing secretary
Involving conformity to accepted standards and methods			Typing, law (solicitor), accountancy
Work dealing with people, directly			Nursing, medicine, teaching, social work
	indirectly		Secretarial work connected with social work, advertising
	ideas, symbols and facts		Scientific research, bookkeeping, foreign correspondence
	things		Dressmaking, engineering, carpentry
Human interest, personal			Nursing, medicine, social work, teaching, showroom, reception
	abstract		Medical research, sanitary inspection, politics, statistics connected with social services
Impersonal or non-human work			Engineering, gardening, statistics (unless connected with social services)
Individual work			Research work, medicine (G. P.), law (solicitor)
Team work			All work in which "pulling together" is essential: nursing, hotel work, most social work, etc.
Altruistic ideals—essential			Nursing, social work, etc.
	satisfied		Medical research, pharmacy, radiography, farming
	not satisfied		Work in firm run solely for profit of individuals, etc., though altruistic ideals may even here be satisfied by personal service
Social service			*E.g.*, social work, medicine (any branch), politics, nursing
Personal service			Private secretary, companion, showroom, nursing, children's nursing
Solitary work			Farming, much research work, some cooking
Personal contacts—in work			Teaching, nursing, medicine, showroom, reception, etc.
	in surroundings—essential		Typing or bookkeeping in large office
		possible	Solitary office work in college or institution (social life possible). Possibly also dispenser in hospital
Degree	Permanent		Teaching, nursing (with colleagues), large office
	Temporary		Hotel managing, lawyer (solicitor), doctor (G.P.), nursing (with patients)
	Momentary		Showroom, reception, enquiry office
Type	Intellectual		University lecturing, librarian (special libraries)
	Not highly intellectual		Nursing, law, business
	General public		(All types) showroom, hotel reception
	Working classes		Factory supervisor, nursing
	Poor		Social work, nursing
	Children		Nursery schools and kindergarten teaching
Sex	Own sex		Varies with individual posts
	Opposite sex		
Independent, responsible work			Company secretary, medicine, law (solicitor), own business, organizing secretary
Dependent work			Private secretary, clerical, all junior posts
Relations to others—Organizing and controlling—natural leadership			Probation officer, club leader, teaching
	Controlling by authoritative position		Staff management, supervising
	Influencing, e.g., by persuasion or argument		Commercial traveling
	No influence required		General clerical work, dressmaking, scientific research
	Submission to others dominant feature		Typing, bookkeeping, etc.
Varied work frequently changing jobs of very different types			Kindergarten, medicine (G. P.), social work
Varied work frequently changing jobs of similar type			Medical research, radiography, varied clerical work
One kind of work with sudden interruptions, e.g., telephone			Clerical in charge of telephone or reception
Same work all the time without interruption			Typing, bookkeeping, etc., not in charge of telephone or callers
Carried on on own drive			Research work (including medical), organizing, teaching, journalism
Frequent stimulus from surroundings			Medical (G. P.), nursing (hospital), salesmanship, shorthand and typing

JOB ANALYSIS IN INDUSTRY

RICHARD STEPHEN UHRBROCK

JOB ANALYSIS has been defined behavioristically "as the search for habits necessarily used by a workman on a job."[1] It is essentially a means of identifying and listing the various functions, responsibilities, duties, and tasks of a worker. Tasks, or operations, may be further broken down by means of time and motion studies so as to identify the elements involved. The dividing line between the field of the job analyst and that of the time and motion study engineer is not clean cut and sharp. The job analyst deals with fairly large descriptions of work units. The time and motion study engineer, on the other hand, may use job analysis techniques as a preliminary to the more detailed study of the operations and elements that comprise a cycle of work.

Job analysis, to be comprehensive, embraces more than a listing of the tools and acts essential to perform a series of operations. It also implies a thoroughgoing study of the physical, mental, temperamental, educational, and social characteristics of the one who uses the tools and performs the acts. "A worker engaged in making machine parts requiring great precision, or a clerk keeping office records, may be provided with practically ideal working conditions. He may have excellent supervision. Yet the work may not be progressing smoothly because the worker is handicapped by defective vision, poor motor coordination, worry, lack of interest in the job in hand, mental deterioration resulting from the effects of an insidious disease, or a host of other factors. Only the study of the man himself will unearth such causes. And only such a study will make job analysis data meaningful."[2] A study of the worker must parallel the study of the work if job analysis data are to be used to the greatest advantage.

Job analysis is a *method* of gathering pertinent facts about a worker and his work. The method to be used varies, depending upon the objective of the study. Different sources are consulted, and different records result, depending upon whether one is using job analysis to devise a training program, develop a safety plan, prepare employment specifications, or revise a wage payment plan.

II
THE USES OF JOB ANALYSIS

There are many uses for job analysis and for the occupational specifications which may be written after the analysis is concluded. Watkins[3] has shown that job analysis may throw light upon such varied industrial needs as education and training; studies of health and fatigue; adjustment of grievances; accident investigations; machine maintenance, operation, and adjustment; time and motion studies; selection and placement; job

[1] Strong, E. K., Jr., and Uhrbrock, R. S. *Job Analysis and the Curriculum.* Baltimore, Williams & Wilkins, 1923, pp. 22-23.

[2] Uhrbrock, R. S. "The Psychological Aspect of Job Analysis," *Handbook of Business Administration.* (W. J. Donald, editor.) New York, McGraw-Hill Book Co., 1931, p. 1157.

[3] Watkins, G. S. *Labor Management.* Chicago, A. W. Shaw Co., 1928, pp. 214-21.

grading and classification; wage setting and standardization; transfers and promotions. G. L. Bergen [4] has indicated further uses for job analysis information: to define limits of authority, disclose duplication of effort, show faulty work procedures, indicate cases of individual merit, or causes of personal failure, and promote common understanding between various levels of workers and the management. Bergen also lists the uses of occupational specifications, with particular emphasis upon their value in constructing training programs, indicating "blind alleys" and planning adequate wage rates.

The particular advantages of job specifications to education have been listed by the American Council on Education.[5]

III
AN EXAMPLE OF JOB ANALYSIS

Recently the positions of 163 foremen in a large manufacturing organization were analyzed. At the same time the foremen were given medical and psychological examinations. Personal history records also were studied.[6] The final task lists contained from 50 to 350 items. After all of the duplications were eliminated a Master Task List containing 2,263 statements was prepared. These represented the things done, in various combinations, by all of the foremen.

A study of foremen's tasks indicated that the foreman has four main *functions,* namely, to—

1. Manage men
2. Maintain and use equipment
3. Handle materials
4. Control operations and processes.

Each of these functions may be subdivided into responsibilities. For example, we may consider that a foreman has the following nine *responsibilities,* as he discharges his first function, that of managing men:—

1. Secure and select men
2. Coordinate the work force
3. Improve morale of the organization
4. Prevent accidents
5. Promote health
6. Interpret and transmit company policies
7. Record and report personnel data
8. Train operators, such as mechanics and inspectors
9. Develop a program for his own self-improvement.

Under each responsibility we may list the duties that must be performed if that responsibility is to be taken care of adequately. If the foreman really accepts Responsibility Number 3, "improve the morale of the organization," he must perform the following twelve *duties:*—

1. Study personality and peculiarities of each individual
2. Call workers to account for poor work
3. Promote and encourage deserving workers
4. Handle cases of transfer and discharge
5. Make a fair apportionment of work
6. Participate in the setting of wage rates
7. Regulate hours
8. Divide and define responsibility
9. Distribute wages and make adjustments in pay
10. Adjust workers' difficulties
11. Establish effective relations with employes
12. Discipline violators of company practices.

Each duty may be further subdivided into routine tasks. These task statements

[4] Bergen, Garret Lawrence. "Uses of Job Study," *Personnel.* VI (1929), pp. 85-100.

[5] "Job Specifications," *Educational Record Supplement.* VIII (1927), pp. 36-40.

[6] Uhrbrock, R. S., and Richardson, M. W. "Item Analysis," *Personnel Journal,* XII (1933), pp. 141-54.

are really made up of the units that were collected by means of the job analysis technique. For example, the duty to "discipline violators of company practices" is made clearer if we examine some of the six separate things done, or *tasks* performed:—

1. Reprimand subordinates
2. Warn habitually careless persons
3. Determine action in disciplinary cases
4. Confer with superior on difficult cases
5. Report insubordinates to superior
6. Enforce instructions by rewarding and penalizing.

In reverse order we may view the work of the foreman in the following terms. Depending upon the scope of his position he is called upon to perform anywhere from 50 to 350 separate tasks. He cannot be considered fully trained until he is capable of performing each of these tasks smoothly and easily.

A group of related tasks may be considered as the elements that make up a *duty*. The untrained man has difficulty at this stage, because the efficient discharge of a duty calls for the smooth coordination of a number of related tasks. The pattern of activity is important, as well as the ability to perform each separate step.

We may classify a group of duties as a *responsibility*. This larger unit depends upon the close integration of the smaller parts.

IV

JOB ANALYSIS AND TRAINING

Finally, we may call the grouping of major responsibilities a *function*. These classifications are not rigid. They suggest, however, the hierarchy of abilities that must be considered in adjusting men to the demands of work. Obviously, a foreman may cease to develop at any one of these stages. The trainee at first probably views his work as a great mass of unrelated tasks. As he masters these and notes logical relationships, he sees certain duties crystalizing in definite outline. Without doubt, many foremen stop developing at this level. They do not see how the duties are grouped into larger, related wholes. It is at this point that training by means of the *conference method* can be made extremely effective. With instruction and drill at each level, it is possible to improve tremendously the skill of the foremen on each of these distinct training levels.

Doll[7] has shown that public institutions such as prisons, reformatories, and training schools for the feeble-minded provide excellent laboratories where job analysis methods may be used in developing educational programs. This is particularly true where thoroughgoing physical and mental measurements are made on the inmates.

V

OCCUPATIONAL TERMINOLOGY

Employment terminology should be considered seriously by job analysts in order to avoid needless confusion in comparing or combining data from different sources. Telford[8] has defined the terms used in public personnel offices. Williston[9] lists standard terms that the American Council on Education has found useful in analyzing positions.

The vocational counselor should have a clear picture of the part job analysis may play in the development of a training program. It is possible to inventory

[7] Doll, Edgar A. "Job Analysis as a Basis for Teaching," *Bulletin of the Taylor Society*, XIV (1929), pp. 134-41.

[8] Telford, Fred. "Employment Terminology," *Public Personnel Studies*. II (1924), pp. 152-66.

[9] Williston, A. L. "The Activities of a Research Scientist in a Government Service," *Educational Record*, X (1929).

the tasks and duties that make up the quota of responsibilities of a worker, or, in other words, to list just what a worker does during the course of a typical day, week, or month. Descriptions have been written to cover jobs ranging from that of unskilled clean-up men to the President of the United States.[10] Job analysis is concerned primarily with finding out what the worker does and then stating the results in usable and uniform units. The tasks and duties can be analyzed so as to set down in definite terms just what a man has to know in order to perform each task. Suppose, for example, that a worker is required to "open and close valves." Considerable knowledge and training are required, depending upon the type of valve employed and the gas or liquid that is to pass through. If the task is "open valve to allow builder to run into boiled soap crutcher," the operator should know: (a) the soap must be in the crutcher before the builder is added; (b) the builder should be run in fast to prevent "air crutching"; (c) if the builder is too cold, the soap will "set up" in the crutcher; (d) if the crutcher is not running, the builder will go to the bottom and possibly leak out or fail to mix properly; (e) if the valve is left open, the builder will "set up" under the gate and damage the valve on reclosing; (f) builder splashed in the eye is dangerous; (g) builder may "set up" at the valve so that it can be opened wide temporarily without flow or may break loose with a rush.

On the other hand, if the task is "open valve to allow lye solution to run into cold process soap crutcher," the operator must possess a different combination of knowledge. He must know: (a) the oil should be in the crutcher first; (b) the temperature of oil and lye must be right to prevent uneven saponification; (c) lye splashed on the skin is injurious; (d) the lye should be run in slowly to cause gradual mixing; (e) the crutcher should be running; (f) a leaking lye valve will change the proportions so as to make a valueless product; (g) the lye solution will attack certain metals badly; (h) if too much lye is run into the crutcher the resulting soap will be so hard it cannot be cut.

Executive and supervisory employes can indicate the degrees of difficulty in the different tasks. Agreement can be reached as to the things the trainee should be taught first. The order of instruction for the beginner can be determined and, finally, the method of teaching the trainee how to perform the tasks involved can be stated by training experts.

VI
CAUTIONS IN JOB ANALYSIS

A word of caution should be introduced here. The Federal Board for Vocational Education represents one of the best sources for printed job analysis data. In one of their practice conferences on making out instructions,[11] a leader emphasized the need for careful analysis of apparently simple operations. As reported:—

> The temporary leader opened the conference with the remark that few people realize the difficulties a 'green' man encounters when trying to learn a new job. For the man who instructs him, so many of the processes have become mechanical through long usage that he is apt to disregard the fact that to the new man none of them is automatic and that he must be taught each one. The leader wished to demonstrate this fact by analyzing the simple operation of putting on one's coat.

[10] Williston, A. L. "Selection of College Graduates for Government Service," *Educational Record* (1929). (*See also* American Council on Education, *Instructions for Writing Records of Usage.*)

[11] United States, Federal Board for Vocational Education. *Report of a Training Course for Foreman Conference Leaders.* Washington, Superintendent of Documents, 1932, pp. 66-67.

First, the group was to name for him the necessary steps in doing this, after which he would demonstrate the operation according to their instruction. The 16 steps listed in the first column of the chart (see next page) represent the instructions of the group, and the 24 steps in the second column represent the instructions with the various changes necessitated by the demonstration.

This conference was an interesting and amusing demonstration. Though the process was analyzed by the group, only 16 steps were listed in the first column. When the temporary leader attempted to put on his coat by following these instructions closely, he incurred considerable difficulty, so that the second column included eight additional steps and even the final list could be broken down into finer subdivisions.

At the end of the demonstration the conference leader listed the following as a good method of determining instruction:

1. Detailed analysis of each operation observed from actual operating demonstration by experienced man
2. Check by demonstration, using "green" man if possible
3. Correct errors pointed out by second demonstration
4. Rewrite analysis
5. Use diagrams and illustrations of difficult steps.

That careful analysis very probably was made with a left-handed subject, and describes the method of putting on a coat that about ten per cent of men use. Think of the difficulties involved if someone should decide that here is the *one best way* of performing this operation and should attempt to force the rest of us to conform to this pattern! The need for the study of the methods used by many workers, before writing standard instructions, is indicated clearly, and the necessity of taking the facts of handedness into consideration, particularly in bimanual activities, is emphasized.

Carefully prepared occupational specifications, intelligently interpreted by well trained vocational counselors, are of inestimable value in developing guidance programs. Only recently have counselors become aware of the information that lies in the files of corporations where jobs have been analyzed for the past 15 years. For many reasons, only a small fraction of that material has appeared in print. Some counselors will be tempted to ask for access to the data and will write letters containing requests such as the following. "Please send me your schedule of job analysis and job specifications that you are using, and also any other occupational analyses that you may have." If that request were complied with absolutely in one corporation it would mean handing over the results of a $15,000 research project. In some cases vocational counselors will be given aid. In others they will meet with flat refusal. In this field haste should be made slowly.

VII

TRAINING IN JOB ANALYSIS

As a preliminary step in the self-education of the vocational counselor, he should study the extensive literature of job analysis. It would be a good exercise to prepare an annotated bibliography of at least 200 titles, so as to be familiar with printed sources. No one has a clear concept of what job analysis means until he has analyzed a job; so, the vocational counselor who wishes to talk intelligently with the industrial job analyst should find some one job in his school, or neighborhood, where he will be tolerated until he has listed the tasks, duties, responsibilities, and functions of the worker who consents to be studied. He will learn a few things about human nature when he attempts to win the confidence of the man or woman whose job is to be analyzed and who needs to be assured that the analysis will not affect his job status adversely. He will learn more as he works to maintain the worker's confidence while the analysis is in progress. He may study the work of a switchboard operator, typist, comptometer operator, janitor, window cleaner, elevator operator, playground supervisor, or any one of the many payroll jobs that exist in most

ANALYSIS OF THE OPERATION OF PUTTING ON A COAT

Steps in instruction recommended by the group	*Final instructions*
1. Grab coat by top with right hand (palm of hand toward inside of coat, fingers on top and rear)	1. Face inside of coat
2. Raise coat shoulder high with inside of wrist on right shoulder	2. Place right hand on collar, fingers to the rear, thumb inside
3. Hold left shirt sleeve with left fingers against palm	3. Close hand
4. Insert left hand in left sleeve	4. Bring coat toward left shoulder
5. Pull on coat till hand is exposed	5. Grasp left shirt sleeve between fingers and palm
6. Hold left arm up vertically	6. Raise left hand
7. Remove right hand	7. Place in top of left sleeve
8. Place right hand against back between shoulder-blades, elbow down	8. Raise right hand forward and left
9. Hold right shirt sleeve	9. Raise left arm straight up
10. Feel for right sleeve opening	10. Shake left arm until left hand is exposed
11. When located pull on right sleeve	11. Drop right arm
12. Shake shoulders back to front	12. Grasp right shirt sleeve with fingers
13. Raise both arms to 45° position	13. Bring right arm around back between body and coat
14. Lower arms	14. Lean to right
15. Grasp lapels with both hands	15. Grope for opening
16. Pull down and forward	16. Force arm into opening
	17. Raise right arm backward and up
	18. Lower left arm slightly
	19. Drop arms
	20. Release shirt sleeves
	21. Shake shoulders
	22. Catch lapels
	23. Draw together
	24. Pull down

educational institutions. The vocational counselor who does this will be perplexed by the problem of stating and organizing his findings in a satisfactory manner. At this stage he will find many holes in his analysis and he will have to return to the worker for additional information or observation.

With the analysis completed, the vocational counselor should proceed further and list what the worker must know to perform each unit of work. Then he should indicate the methods of teaching a beginner how to perform each task. Suppose, for example, that he has analyzed the work of an operator of an electrically driven calculating machine. He will find it an interesting exercise to plan the exact steps necessary to perform the operations of addition, subtraction, multiplication, and division. Then he should find someone who knows nothing about such machines and attempt to teach the operations according to the plan that was developed. The failure that will result will be a humiliating experience if the vocational counselor is an experienced teacher. It will require much work, and careful revision, to state the instructional steps in "fool-proof" order.

When the vocational counselor can come to the industrial job analyst and say, *"I know the job analysis literature, I have analyzed one job thoroughly, I have devised a training program based upon my job analysis data, and I have trained one person according to that plan,"* he will be in a position to talk intelligently about the methods and uses of job analysis. The dilettante who thinks that job analysis is a new tool that will solve his guidance and curriculum troubles will hamper the efforts of serious workers in the field.

CLASSIFYING OCCUPATIONS FOR INSTRUCTIONAL PURPOSES

W. W. CHARTERS

IN 1928 Rochester Mechanics Institute undertook a project to discover the best types of position in Rochester for which it might train its students.

By tradition the Institute for the better part of a century had been serving the city by providing certain types of education that were not available either in the public schools or the University of Rochester. From the point of view of these organizations it served the *off-trail* student—that is, the student who could not get the education he wanted in the public schools or the University. Night classes, home economics courses, architectural subjects, and a wide variety of other fields open both to men and women were explored throughout the years.

It had been a pioneering institution working in new fields, and as these fields were effectively entered by the schools and the University the Institute relinquished these areas, and directed its effort toward the exploration of the numerous fields which had not yet been opened to the inquiring minds of off-trail people.

II
THE OBJECTIVES OF THE INSTITUTE

So it was natural that in 1928 the Institute should review its objectives to discover whether or not on the one hand it was providing the city with graduates who could serve its greatest needs, and on the other hand preparing its students for the best kinds of jobs, appropriate to their years of training, that could be found in the city. The Institute had a plant covering a city block of buildings and valuable equipment to train students for a variety of positions. It had a faculty assembled with great care through the years. Training was given in the liberal subjects, industrial art, chemistry, electricity, foods, architecture, mechanical engineering, and retail distribution in the day school and a variety of courses in the night school. And the Institute did not wish to scrap the plant and personnel—could not, in fact, because it did not have the money to provide a new plant. Its problem, therefore, became that of evaluating what it had been doing and to study its market to discover the kinds of "product it should manufacture" in the next decade or two.

The survey that the Institute projected is not peculiar to institutions of its type. Every unit of every school system—vocational or general—should in the interests of economy and intelligent trusteeship make a periodic canvass of its work to see if it is serving its community and its students as effectively as it can. Therefore, the study of the Rochester institution has a moral for all vocational units in public and private schools.

The problem of the Institute was briefly to analyze the positions in the community for which it could prepare, and discover the most useful and attractive

among these as a basis for its curricula.

The study was initiated by analyzing the positions which were held by its graduates. In making this investigation the principle was assumed that graduates in general gravitate by trial and error toward those positions for which their training fits them. If the graduates of the department of architecture gravitate toward building construction that evidence must be taken into account in any decision about the industrial objectives of that department. One assumes that there is an industrial demand for trained men in building construction if the graduates are able to enter it, and in general graduates would not enter the field if it did not possess attractiveness for them. But these data alone are not sufficient to determine objectives because there may be other positions more useful and attractive than those which the graduates have hit upon. Other data should be secured.

III
THE PROCEDURES OF THE SURVEY

The best source of data was found to be interviews with the upper level of executives in business in the Rochester area. They were easily approached because industry in Rochester is very much interested in the Institute, pays cash into its treasury, and uses its students on cooperative jobs. These business executives were asked by the chemistry department, for instance, to survey carefully the needs of their industry for workers with chemical training and to identify positions with three characteristics: (a) *those terminal jobs in which graduates with training given in chemistry would be most useful to the business;* (b) *those which were attractive enough to serve as careers for graduates;* and (c) *those who could be reached within a reasonable number of years.* When these terminal jobs had been selected, the executives were asked to indicate the intermediate jobs which would be open to the student upon graduation and form a promotional ladder leading to the terminal jobs.

This proved to be a very effective technique. The executives were so much interested that they spent many hours in consultation with the heads of departments. They called into the round of interviews every one in the plant who could give advice. The interest was partly born of self-interest in getting good men for positions weakly manned, and partly of confidence that as in the past the Institute was sincerely and effectively interested in developing good men and women for them. The interest led to a succession of interviews, the continued revision of job charts, and to a final agreement with the departments as to the areas to be made the vocational objectives of training in the Institute.

There was added to the analysis of graduate occupation and the interviews with executives a statistical analysis of national demand and supply of occupations related to the Institute. For instance, when the department of applied art had been interested in training teachers of art it was logical to study the demand or supply of art teachers. Or when hospital dietiticians were trained it was appropriate to discover the turnover in this area and the relation of the national supply of graduates from training schools to the demand. If the demand far exceeded the supply one decision about training in the Institute would follow; if the supply was greatly in excess of the demand another decision would be reached. National conditions necessarily affect local plans and policies.

Other techniques of analysis were used. Correspondence was carried on with persons familiar with national fields; the

opinions of cooperative students were secured, and in brief all sources in which data might hope to be found were canvassed.[1]

IV
FUNCTIONAL CLASSIFICATION OF OCCUPATIONS

All this leads us directly to the theme of this issue of *Occupations*—job analysis and occupational classification. We have before us at the Institute a classification of occupations based upon the purpose of an institution. The Institute by tradition and equipment was prepared to train students for certain general fields related to art, foods, electricity, mechanics, building construction, retailing and chemistry. This is a broad classification. Within these fields a further classification was demanded.

In effect the study resulted in setting up 23 groups of occupations—one in the field of *photo-technology*, four in *applied arts*, six in *electricity*, four in *mechanics*, two in *chemistry*, one in *building construction*, two in *food administration* and three in *retailing*.

These groups of occupations were related closely to each other in both vertical and horizontal directions. An illustration will assist in making this clear. For instance, in the mechanical department four areas were set up. Among these let us select the area of the *technical supervisor*. Here we find 40 positions in the area so closely related that they can be trained for in a single curriculum consisting of core materials and electives and extending over a period of three years. The basic *terminal* job is that of *technical supervisor*. But 10 *supplementary terminal jobs* are cared for in the curriculum, such jobs as *tool engineer, process engineer,* and *chief inspector*. To these are added 12 other terminal jobs which are so closely related to the foregoing that the student could in later life easily acquire on the job the information and experience needed to fill them. They include such jobs as *salesman, demonstrator,* and *purchasing agent*. To this group of 23 jobs may be added eight *intermediate jobs*, one or more of which the graduate will fill after graduation while working toward one of the terminal jobs. And to these are added nine *jobs of a minor sort* which are filled by a student while in training.

Thus in this area we have a family or group of 40 jobs which are closely related and belong together. They constitute a class. Parenthetically, it should be noted that a curriculum derived from this classification does not narrowly prepare for a single job. It is of necessity a relatively broad curriculum, directed upon an area and flexible and fundamental enough to assist its graduates to shift from position to position within the area in response to individual preference or rapid industrial change.

This method of classification is opposite in intent and method to a census classification. That is *logical* and *structural;* this is *functional*. The census classification begins with a universal overview and embraces all occupations. This classification builds upon the needs of an individual institution. It is neither complete nor comprehensive. But it performs its function. It reveals to the institution the positions for which it may train, it groups them in families which may be served by common techniques and provides a curriculum with appropriate supplements for positions which vary from the basic jobs. For educational purposes it is vastly superior to a census classification.

[1] Charters, W. W. "Selecting Institutional Objectives," *Personnel Journal*, June, 1933, Vol. XII, pp. 7-11.

V
IMPLICATIONS FOR VOCATIONAL EDUCATION

Finally it is a type of classification that can be made by every vocational school. A commercial department of any progressive corporation makes every five years or every decade at the maximum a thoroughgoing analysis of its potential sales. In like fashion the commercial department of every school needs to survey its potential services to its community. It finds out the most useful and most attractive terminal positions which its graduates may hope to hold within a reasonable time. It discovers the intermediate positions to be secured upon graduation. It should make a careful demand and supply study of such positions within its area of service so that the students will be steered away from blind alley jobs and the community's needs will be met. The techniques of analysis are simple and the labor is not arduous. The by-product of goodwill among business executives will alone repay the effort. But for the goodwill to persist the curriculum and training must follow where the data lead.

Local classifications for local uses made by an analysis of local situations are within the range of competency of local faculties. They give point to national programs of education by individualizing curricula to meet the needs of the local communities that support them.

ENLIGHTENMENT

We note in the advertisement column of a prominent newspaper the following:

VOCATIONAL COUNSELING

Leading authority teaches this new, highly remunerative profession . . .

After the above there follows a name and an address. For obvious reasons we do not give them. However, the advertisement brings important news. We now know a leading authority in vocational counseling. We know that the profession can be taught. We discover that the profession is "new." We are thrilled to learn that it is "highly remunerative." And at last it is settled that our noble calling is a "profession."

So that's that!

NEW ASPECTS OF JOB ANALYSIS

FRANZISKA BAUMGARTEN

Translated by M. G. Preston

OUR FUND of knowledge relating to the vocations is the Achilles' heel of applied psychology. For the most part, the development of aptitude testing has miscarried because this fund of knowledge is insufficient. In no country have attempts to develop fruitful methods for aptitude analysis achieved a satisfactory conclusion. At the present time, although we possess a considerable number of methods,[1] none of them has proved completely satisfactory. For this reason the question must arise, "Where does the fault lie?" The answer to this question may lead to the discovery of a satisfactory approach in occupational analysis.

As investigators started to study occupational aptitudes from a psychological point of view—that is, as they attempted to ascertain the psychological aptitudes necessary for the practice of a given occupation—they quickly discovered that the pattern of occupational activity is extremely complicated. And, as in other similar cases where a task appeared to be of great difficulty, it was believed that the method of analysis might be of service. Attempts were therefore made to split up occupational activities and to study them as a series of simple tasks in order that from these simpler processes might be synthesized those psychological capacities which were deemed necessary to the job in question. The classical investigations of occupations of the early days of applied psychology made use of two principal methodological procedures: (1) the analysis of the task into simpler activities; and (2) the determination therefrom of the underlying psychological traits.

Before long, however, difficulties arose with both of these procedures. In the case of the analytic procedure, the problem, "How far may analysis go?" appeared. As Lipmann properly pointed out, as early as 1922, with the analysis of the processes of work into the most elementary possible functions, the essential, particular, and specific character of the occupational activity is lost. The limits of such an analysis have not been determined to this day. To meet the problem there have been developed a number of other methods of a descriptive nature (vocational profile, job description, job studies). In effect, however, these methods likewise depend upon an analysis of the processes of the job. And until today the degree of analysis which should be used in a particular case has remained to be decided by the mature judgment of the investigator.

"What type of data do these occupational analyses present?" is another question which arises in this consideration. The enumeration of the tasks which must be carried out in the doing of a job is nothing more than a presentation of the technical side of the job. Occupational analyses present a picture of the technical

[1] Baumgarten, F. *Die Berufseignungsprüfungen: Theorie und Praxis.* Munich, 1928.

aspects. And to this technical picture must be added corresponding psychological data; that is, certain wholly fixed psychological characteristics which are indispensable for the execution of the tasks must be at hand.

II
EXAMPLE OF THE ANALYTIC PROCEDURE

In the manufacture of electric lamps it is necessary to draw the filament through small openings at the base of the globe. In this job the worker, if she is to perceive the small openings, must have a sharp eye; if she is to manipulate the filament she must possess fine tactual and articulatory discrimination, and if she is to execute the appropriate movements she must be quick in her movements and sure of hand. Such a correlation of psychophysical abilities and technical tasks proceeds upon the ground of logical consideration exclusively. Practice shows that such a correlation of psychophysical capacity with the varying subordinate tasks of a job is subject to many varied constructions. The relations are certainly not simple.

It may appear, for example, that nothing but the ability to express oneself with ease in writing is necessary to authorship. Still, we know from the biographies of noted authors how difficult, even for the most distinguished of them, is literary composition. We may consider, for example, Gustave Flaubert who, as Goncourt writes in his diary, did not leave his house once during a period of four weeks, in order that his work might be pushed on, and yet during this time produced only 17 pages. Or we may think of the Nobel Prize winner, Thomas Mann, who wrote this apparently paradoxical sentence from the fund of his own experience: "An author is a man to whom writing comes particularly hard."

One methodological principle that follows from facts of this kind is that even an apparently self-evident correlation of ability with task should be subjected to the illumination of testimony by experts or (where the higher vocations are involved) viewed in the light of evidence to be found in biographies or autobiographies of well-known representatives of these occupations. Moreover, facts of this kind show beyond doubt that certain other characteristics, such as creative impulses, imagination, the talent for constructive organization, may compensate for the lack of a language ability which would seem absolutely indispensable. With this we arrive at a conclusion of considerable importance to the vocational counselor, namely that *the same job may be mediated by quite dissimilar psychological abilities and characteristics.* Two typists may give equally good performances. One may be able to type with exceeding rapidity, but still, because of an inadequate attention span, have to look frequently at the manuscript. The other, although slower, may possess such a good memory that she is able to save time in typing by easily remembering a long phrase read only once. The excellent performance of one telephone operator may be explained by acute hearing and rapid arm movements, while in the case of another an ability to concentrate may compensate for average hearing or slowness of arm movement.

Psychological *compensations* are factors of extraordinary importance which scientific vocational guidance must not fail to consider. Their presence leads to the remarkable law that *the higher the occupational activity the greater the possibility of substitution or compensation.* And in this connection, compensation is not so

much a matter of the replacement of one ability by another as of the equalization or tempering of psychological capacities by temperamental characteristics. That industry, care, perseverance, the exertion of the will, or adaptability, may compensate for merely average aptitude for a task is a fact which has already been amply established in the case of school children. Alfred Adler, in his well-known theory of "overcompensation for feelings of inferiority," has emphasized the point that the deficiency which seemingly is a bar to a career is often the very thing that impels the individual to superior performance in it. The fact explains the astonishing yet well-known observation that many cripples have been distinguished by notable achievements in the higher professional fields.

By circumstances such as these we are enjoined not to regard the living organism of man in a rigid relationship with the requirements of a psychological analysis of the occupations. The whole aspect of man must be considered and the interrelatedness of the various psychical abilities and characteristics must be reckoned with. The sore spot of the entire problem lies in this situation. Up to this time, the psychical dispositions have been conceived of as purely intellectual.

Nevertheless man, both in vocation and in daily life, is oriented emotionally. The goal towards which each of us is impelled by his inner drives has a two-fold aspect—self-preservation and effective expression of personality. The job is a means by which either or both of these aims may be realized. In the satisfaction of his love of work which the artist seeks, he not only develops himself but at the same time, by means of the proceeds of his work, sustains and prolongs his life. The day laborer who works for mere subsistence would seem in general to be without consciousness of the development of his personality. Nevertheless, psychologists who have studied men at work question whether it is humanly possible for anyone to engage, day in and day out, year in and year out, in an occupation which does not satisfy the inclinations, impulses, and ambitions of human beings.

III

JOB CLASSIFICATION IN TERMS OF INCLINATION AND AVERSION

For this reason, occupational analysis must take an entirely new road. It must investigate and determine those characteristics of each of the vocations which relate to the emotional life of the individual, that is, the extent to which each of the occupations is able to satisfy the impulses and the inclinations of human nature. For this purpose two principal methods are available.

In the first place, we must learn what relation individuals bear towards the materials with which they work. The problem here is to ascertain the nature of whatever emotional relationships exist between the individual and the material.

Insight into this question may be obtained by inquiring from people in the various occupations what, in their particular work, they find pleasant or unpleasant, or what motive it was which inspired them to choose their work. Answers to these questions are striking. For example, one woman, an industrial artist, finds it pleasant to work with wood, because it is a "warm" material in contrast to metal and glass, which she finds "cold," and the glare from which blinds her eyes. The experience of "smoothness" is found by many to be pleasant; others find it unpleasant. Some dressmakers distinguish dress goods as "flow-

ing" when they are delicately finished and pleasant to the touch; others find "flowing" materials extremely unpleasant; they are not "firm" and slip through the fingers. For many young women typing is extraordinarily unpleasant because in this work they experience sensations of hardness and inflexibility in place of those of softness and flexibility which they prefer. For such people typing is a "grind."

Inclinations and aversions of this kind are sometimes rationalized by the worker. "One may be dirtied by doing this," or "One may hurt oneself working with glass," or "The splinter may puncture the skin," may be given as justification for aversions.

From preferences and aversions of this sort one may conclude that there is a relationship between men and the various materials with which they deal in their various occupations, a relationship which shows that the activities which men do in their jobs are related to essential temperamental elements in the psychophysical constitution of man. *Vocational and occupational analysis must assume the task of establishing the significance of these temperamental characteristics or constituents and of describing their fundamental pattern in its whole setting.*

IV
AN ANALYSIS OF AFFECTIVE TONES

How does such an analysis proceed? First, certain dichotomous categories of qualities of materials may be formulated, such as:—

1. Warm—Cold
2. Mild, flowing, slippery, soft—Harsh, rigid, hard
3. Colored—Colorless
4. Lustrous—Lustreless
5. Rounded—Irregular
6. Dirty—Clean
7. Smooth—Rough

Then an investigation applying the point of view expressed above must be undertaken to ascertain the psychophysical interests, impulses, and inclinations which are related to such categories of qualities of material. This much can be maintained today: these sensory tendencies are expressed in all those occupations in which sensibility is involved, as for example, the joy in the experience of color in the case of workers in color; the pleasure in musical tones experienced by workers in plants manufacturing musical instruments; olfactory and gustatory sensitivity apparent in perfume shops, chemical works, candy kitchens, bakeries, etc.; temperature feelings present in the case of glass and foundry workers, etc.

V
PREFERENCE FOR MOVEMENT FORMS

It further appears beyond doubt that the preference for the way of handling or manipulating an object or tool which a job makes necessary—for the "function of the tool," so to speak—bears a definite relationship to the inherent psychophysical peculiarity of the job activities. We might designate this as *interest in function*. From inquiries on this subject we learn that it is a significant fact for the worker whether his task is to hammer, bend, or forge the material, or whether it is to break it up or to tear it apart, as in the case of the stone cutter, or to assemble it, as in the case of the pipe fitter. Among the preferences of the former kind appear the destructive impulses, in the latter appear creative and constructive tendencies. We have arrived here in a genuine *terra incognita* of occupational analysis, the exploration of which we may expect to answer many

of the riddles which beset the problems of occupational choice and change in these days. Investigations of this kind, which up to this time have not been undertaken, are now being carried out in various existing occupations for women by my colleagues and myself. We are hoping that this work will provide a new insight into the problems of occupational choice.

VI
SOCIAL INTERRELATIONS OF THE JOB

A second new aspect of the problem of vocational analysis is of no less importance; it pertains to the social interrelations of the occupational activities. By vocational analysis in the earlier days was meant a record of the specific and complete mechanical activities involved in each of the occupations. So, for example, in the case of the retail storekeeper the activity of selling, in the case of the typist the actual mechanics of typewriting, and in the case of the dressmaker the operations of sewing were given prime consideration. However, when we direct our attention solely to such specific occupational activities we are really dealing with *abstractions,* for each job is performed in a social or collective environment and each job activity is associated with its social surroundings.

The working man must fit his life in with the lives of others. He must assume a definite status in relation to others. Simultaneously a worker is a member of an occupational group, of an occupational class, and of a collectivity of occupations. A simple example is that of the office worker who has not only to take care of the records and the filing cabinet but must maintain a certain relationship with the bookkeeper, the stenographer, the auditor, the controller and the manager. The retail salesperson must maintain good relations with the public, with co-workers in the same store, and with supervisors. On the other hand the supervisor must exercise the greatest consideration with respect to his subordinates.

These human or social relationships are frequently more important with respect to the outcome of the job than the quantity of production on the job. If an employe happens to be a competent worker but sensitive and contentious, he may be shunned and avoided by the remainder of his group. If, on the other hand, he is less efficient, but considerate and friendly in his behavior, his mistakes are apt to be endured alike by co-workers and supervisor. For reasons such as this, it appears that, in general, the measure of satisfactory performance on the job is not solely the quality or quantity of production, as was maintained by the applied psychology of earlier days, but also the quality and the nature of the human relationships maintained on the job. It is necessary, therefore, that in the consideration of an occupation there be borne in mind this determining factor of human personality, namely *sociability,* by which is meant an adaptability to "collective" living which develops on a basis of many varying impulsive drives such as ascendance-submission, friendliness-hatred, social warmth, indifference, or coldness.

In accordance with his nature and the degree of inherent sociability he possesses, the worker assumes a certain status with respect to his occupational milieu (social surroundings of the occupation). This tendency is essentially a disposition that may be termed *adaptability to circumstances.* Individuals distinguished to a marked degree by this disposition are able to deal in a positive manner with men in any kind of work.

People of this type possess a special elasticity of nature; they are apparently unable to develop intimate friendships but do adapt themselves readily to a wide circle of varying acquaintances. William Stern has called that ability of individuals by which they adapt themselves to new tasks, *intelligence*. In life however it is more a matter of adaptation to the surroundings than to specific tasks. In this sense we may well speak of *social intelligence*.

A second variety of social disposition which arises from the assimilation of the individual into the ceaseless flux of collective life may be called *integration*. Adaptation is superficial in its connotation. Integration is of a more profound nature. An intellectually superior individual may be able to adapt himself to uncongenial surroundings but he never feels at home with such surroundings. Complete integration is for him not possible.

A third type involves *reconstruction of the social surroundings* through influences exerted upon the social environment in a specific direction. This may be seen in the case of the despot who by reason of his status as superior leaves a definite impression upon his subordinates, and in the case of the kindly nurse whose presence effects a salutary, allaying tranquility. Each leader, each person in authority, is in a sense a moulder of that social environment which is composed of the people subordinate to him.

Adaptation, integration, and reconstruction are positive social dispositions. There is however a negative disposition which is characterized by difficulty in establishing some kind of definite relationship within the social environment. As a consequence of this disposition a worker may remain completely isolated from the collective milieu. Such isolation may take on harmful forms, inasmuch as the social milieu may seek to exclude the job holder by means of persecution, neglect, or disparagement.

VI
CLASSIFICATION OF JOBS IN TERMS OF SOCIAL DISPOSITIONS

The conclusion which follows from these remarks is that *occupational analysis must investigate each occupational activity where social functions are to be fulfilled to determine the social functions expressed in it,* with particular regard to the underlying social or asocial tendencies. The task of occupational analysis must be to show the kind and degree of social content which jobs possess. From this point of view one may propose a differentiation of occupations dependent upon the nature of the social world in which they are carried on:—

1. Occupations which may be called *occupations of direct influence* are illustrated by the teacher, with his student; the physician, with his patient; the retail dealer, with his customer; and the leader, with his followers. The influence may be upon either subordinates (children and workmen) or equals (the merchant and the public). In work of this kind one may distinguish between the person who does the influencing and the one who is influenced, the subject and the object of the process.

2. *Partnership jobs* in which two people work together exclusively, where the job is predominantly a matter of supplementing personality with personality, constitute a group of another type. Such relationships may arise from the continuous dealings with each other of the same people (a secretary and her boss) or from the dealings of changing pairs (a nurse and her successive patients). Ac-

cording to the particular circumstances, the relationship may be close or casual. Whether cooperation is more or less superficial depends upon the degree of freedom from friction which exists in each case.

3. *Collective work,* in which the job is only a part of a process of production and so must be done in conjunction with other jobs, represents a third group. In this class is work in an assembly line, or work in an agricultural colony, or in a mine. Unforeseen conditions frequently arise in these situations from the man-to-man relationship.

4. The vocations in which workers maintain a very *casual relationship* with their co-workers represents still another class; for example, brokerage employes, or workers in the same factory room. Members of such groups influence each other reciprocally but unintentionally.

5. A fifth group includes *solitary occupations,* in which the job is executed without the presence of other persons—as in the independent vocations of artists, scientists, etc.

These human interactions upon the terrain of the occupational activities create subordinate, coordinate, and superordinate relations of varying intensity (to speak in a social-psychological sense). They vary from a close fraternity to a genuine hostility. We have mentioned above three different dispositions in relation to the social milieu characteristic of vocational activities. The majority of vocations do not belong exclusively in any one of the categories which were enumerated. Many are of a mixed character. To illustrate, the foreman in a large factory is simultaneously chief and subordinate, a fact which in a considerable degree complicates his social attitudes. At this point it may be remarked that social relations in work may be direct or indirect. The leader or the politician who sets up the policy governing the activity of large numbers of people, the legislator who works out decisive propositions in the civil law, does not for the most part come into immediate contact with large numbers of individuals but he must keep them eternally in mind. Conditions such as these complicate the entire field of social relations in occupational life. Likewise, the fact must constantly be borne in mind that it is not only the positive social or collective characteristics which bring about given results. Frequently hostile or grudging behavior in open or disguised form has positive consequences.

VII
SUMMARY

We must therefore regard the following as fundamental factors in each job analysis.

1. Division of the job into its essential activities (the technical description of the job).

2. Correlation with the psychological capacities—but always with regard for psychological compensations.

3. Determination of affective factors such as impulses, inclinations, affective tendencies, particularly in material and in function, which find expression in the job.

4. The social environment of the occupation.

THE FIRST YEAR

Annual Report of the National Occupational Conference to the Carnegie Corporation of New York

In its first year, February 1, 1933, to January 31, 1934, the National Occupational Conference has—

1. Prepared a bibliography of occupational information, comprising about 9,000 titles referring to more than 500 occupations.

2. Inquired into the status of research in this field in order to discover and point out unmet needs, and to encourage or stimulate research in neglected parts of the field.

3. Sponsored special studies in occupational distribution and trends.

4. Sponsored regional conferences of guidance leaders and workers for the purpose of exchanging ideas, examining current practices, and marking out lines of future progress.

5. Assisted in efforts to bring about closer coordination of plans and activities among organizations primarily concerned with problems of guidance and personnel.

6. Maintained an informational and consulting service for organizations and institutions in any wise interested in guidance and personnel problems.

7. Published *Occupations, the Vocational Guidance Magazine.*

These are specific accomplishments, and likewise, in most instances, continuing services. They will be more fully described in this report under appropriate heads.

Each of them falls within the scope of the broad objective: "The National Occupational Conference is interested in all aspects of occupational adjustment, and in all cooperative efforts to study this problem." They accord with the original conception of NOC as a clearing-house of information, with its purpose of furthering research to fill the gaps in present knowledge, and with its aim of contributing to a well planned development of the guidance and personnel movement in both its scientific and its social aspects.

Such were the general notions of direction formulated in the early days when the Executive Committee and the staff were groping for the stars—or rather, taking their bearings from the stars in order to fix the most desirable course for NOC. The original chart has served effectively in guiding us on our way—thus far. It is now important, however, to review our particular acts and activities with reference to the broad objective, and appraise this objective in the light of our first year's experience. This document represents an attempt to tell the story critically and appreciatively, and will conclude with a look into the future.

II

ASSEMBLING INFORMATION

Obviously, the first task was to bring together, so that it might be readily used by counselors and others, the information already at hand.

1. *Bibliography.* Intelligent planning of any program for the study of occupations demands that one know what has

already been done. Without such information NOC may easily dissipate its resources in studying occupations that have been fairly well covered, and may neglect others about which information is sorely needed. When NOC was organized excellent bibliographies were already available in certain limited occupational areas, but no bibliography had ever been assembled which covered completely all available useful information on all occupations. NOC therefore engaged an experienced bibliographer, Willard E. Parker, to survey the field and compile such a bibliography. This task is complete; an annotated bibliography, containing over 9000 titles under more than 500 occupational classifications will be published within a few months by the American Library Association. It is expected that under these auspices the book will be assured wide and useful circulation.

It has not been necessary to wait for publication to make this information available, for since last September it has been in the office files, each title on a separate card. Numerous persons have consulted it and certain portions have been copied and sent to correspondents upon request. The demand for the information has been greater than our typing facilities could satisfy, so that it has been necessary to ask many inquirers to await publication of the book. Additional titles are constantly being inserted in the card catalogue, which in consequence is kept up-to-date.

2. *History of Vocational Guidance.* In the history of vocational guidance are revealed its hopes and aspirations, its philosophy and its practice. Evaluation in the present and prediction for the future can be fairly accomplished only in the light of the past. It has therefore seemed appropriate to make possible the writing of this history by one who has been an active leader throughout the period of inception and growth, John M. Brewer, Director of the Bureau of Vocational Guidance at Harvard University. Dr. Brewer is invoking the aid of all who have contributed to the movement, especially those who were active in the early days. The book will therefore be a cooperative effort. However, the author will deal critically with each phase of the subject and will attempt to evaluate its significance for the future.

3. *Occupational Trends.* The consideration of demand for workers and of the probable growth of an occupation immediately creates the problem of predicting occupational trends. There is a great demand for and a great paucity of information about trends. Prediction in any field is as hazardous as it is difficult. Prediction in a field as complicated and kaleidoscopic as the occupational is considered by some persons to be impossible. But certain promising techniques have been developed. In order that available information concerning these might be organized and made more accessible to all persons interested in occupational adjustment, Walter V. Bingham, Director of the Personnel Research Federation, was asked to assemble the data and prepare a report on methods of studying occupational trends. A part of this report appeared in the February 1934 number of *Occupations, the Vocational Guidance Magazine* in a symposium on "Occupational Distribution and Trends," and the remaining portion in a mimeographed pamphlet presented to members of the Executive Committee. The bearing of this report upon desirable research is discussed below.

4. *Occupational Distribution.* Another consideration in the study of occupations is the relative importance of each occu-

pation in terms of the number now employed. Other things being equal, an occupation which engages the services of a hundred thousand people is more important than one in which only a hundred are likely to find employment.

NOC therefore asked Harold F. Clark, a member of its Executive Committee, to assemble information which would show the relative numerical importance of different occupations and would indicate the amount of occupational information already available for each occupation. This information appears on a chart prepared by Wilbur I. Gooch, under Professor Clark's direction, and is printed with accompanying text in the March issue of *Occupations*. The chart has already proved its value to the Executive Committee in the consideration of proposals for the study of specific occupations. Many other factors must, of course, be considered; e. g., the quality of the available information, the accessibility of reliable new information, the demand for workers, the probable growth of the occupation, the degree of specialization, and the need and the opportunities for training. Each of these must be taken into account in formulating a comprehensive plan.

5. *Aptitude Tests.* One of the most frequent queries coming to the NOC office has taken the form: "What are the best aptitude tests to use in vocational guidance?" At the present time there is no convenient source from which adequate data can be drawn. Numerous studies have been made to validate some of the tests; others have not been validated at all. It is proposed to engage a thoroughly competent psychologist to comb the literature of aptitude testing, to pass judgment upon the extent to which these studies have adequately carried through the validation process, and to compile the material—in other words, to evaluate the evaluations and to write a book or manual (as seems wise) which will be useful to the counselor.

III
NEW INFORMATION ABOUT OCCUPATIONS

The results of the Bingham and the Clark studies re-emphasize the baffling complexity of all studies in the field of occupations. The Gooch chart gives a clue to the needs in the field, but every factor must be kept in mind. Two requests for grants on which NOC acted as adviser to the Carnegie Corporation had to be considered before the chart was ready. In view of the quality of the previous work done by the American Woman's Association and by the Institute of Women's Professional Relations, they were recommended. The request of the Occupational Research Section of the National Vocational Guidance Association was also considered in the light of previous accomplishment, but approval was also indicated by the chart. A further check was supplied by provision for an evaluation of its effectiveness when it is put into use. In view of the great mass of material now in print, evaluation at this point is exceedingly important.

1. *American Woman's Association—Study of Women's Occupations.* "In some respects the economic depression with its attendant lack of employment has been even harder on women than on men. Married women have been refused employment solely because they were married, without regard for the fact that their husbands might be unemployed. Single women have been subjected to other kinds of discrimination." To study in some detail the occupational problems and economic status of women as affected by the depression the American Woman's

Association has received, on recommendation of NOC, a grant from the Carnegie Corporation.

2. *Institute of Women's Professional Relations—Study of Certain Women's Professions.* "The long standing tradition which assigns homemaking to women and breadwinning to men may lead one too readily to overlook the need for information regarding opportunities for the growing army of women who, by choice or by necessity, earn their own living." The interests of this group have been actively championed by the Institute of Women's Professional Relations, to which the Carnegie Corporation contributed prior to the organization of NOC. For further studies of occupations open to women an additional grant has been made during the current year. The publications which have appeared since the date of the grant are:

(a) October, December, and February numbers of *Women's Work and Education.*

(b) *Special Librarianship as a Career,* the first of a series of inexpensive pamphlets.

(c) Supplement to Fellowship Bulletin, 1934.

The publications in press are:

(a) *Dentistry—Its Professional Opportunities,* 114 pp.

(b) *Dentistry as an Occupation for Women.* "A brief, concise pamphlet for the use of students."

Manuscripts almost completed:

(a) A report on the preparation, work, earnings, rank, activities, marital status, etc., of 9065 women on the staffs of colleges and universities.

(b) *Museum Work for Women.*

(c) An article on courses required for graduation and on provision for occupational guidance in 76 women's colleges.

Studies under way:

(a) *The Work of the Home Economics Trained Women in Business.*

(b) *Opportunities for Educated Women in Department Stores.*

(c) *Women in Banking and Investment Fields.*

These three studies were ready for publication in 1930, but the economic situation was changing so rapidly that it was thought unwise to publish.

3. *Occupational Research Section of National Vocational Guidance Association—Study of Store Occupations.* The experience of persons engaged in studying occupational opportunities has indicated that time, effort, and money may be saved by cooperation between persons who are studying the same occupation in different cities. To effect such cooperation certain of these persons have organized an Occupational Research Section of the National Vocational Guidance Association. To this group the Carnegie Corporation has made a grant for a study of store occupations with especial emphasis upon the jobs "behind the scenes."

In recommending the grant to the Occupational Research Section the Executive Committee stipulated that the research be carried on in the light of the experience of NOC during the past year. Therefore the following suggestions have been made to the Section:

(a) The nomenclature used in the study should conform to the corresponding nomenclature used by those who are studying individual traits with reference to occupational ability. The Section should communicate with persons and organizations making studies in this field, such as Drs. Trabue and Viteles, and the National Research Council.

(b) The information obtained for store occupations should in every case correspond to abilities in the individual.

Interests should correspond to real interests in the individual, and generally speaking, items in the analysis should correspond to items on an acceptable occupational ability pattern.

(c) The facts revealed regarding store occupations should provide real data for thinking. They should be the actual facts of occupational life, and, when worked over in the minds of the students, should enable them to think straight and clearly with reference to an improved social order.

(d) The study should consider job satisfaction in terms of the realities of life rather than in terms of preconceived notions. Satisfaction includes the emotion aroused by the job milieu—light, ventilation, fellow workers, boss, and a host of other fortuitous circumstances which have no relation to the essential characteristics of the job itself.

(e) The study should give the trend of each of the store occupations as nearly as it can be determined, and it should also estimate the number of people preparing for it. The rate of increase of the latter may change entirely the significance of the former. In other words, trends are useless, often dangerously misleading, unless interpreted in terms of the adjustment of individuals.

(f) At every point the study should be evaluated in terms of its objective. Methods of evaluation should be suggested and provision made for carrying on such evaluation.

(g) The Institute of Women's Professional Relations has ready a study of the opportunities for educated women in department stores. The Occupational Research Section should familiarize itself with this study in order to avoid duplication of effort on this particular phase.

In each of these phases of the study NOC will, of course, assist, but the direction of the study will be left entirely to the National Vocational Guidance Association, upon which will rest the final responsibility for producing a valuable study.

IV
NEW INFORMATION ABOUT INDIVIDUALS

As has been emphasized in the foregoing paragraphs, the study of occupations, at least as far as the National Occupational Conference is concerned, is primarily a study of their relation to human beings. Therefore a parallel study of individual traits is at all times indicated. The individual is, and probably always will be, a baffling entity, always changing and ever resistant to statistical treatment. Even among the technicians, perhaps one may say especially among the technicians, there is great diversity of opinion as to the validity, reliability, and general usefulness of such measures as have been devised. However, there has been fairly general agreement as to the desirability of furthering the work already done on interests.

Stanford University—Study of Interests. For several years pioneer studies of vocational interests have been conducted at Stanford University under the direction of Professor E. K. Strong, Jr. These have revealed significant facts regarding the nature and permanence of interests and the changes which occur with increasing age. Persons engaged in certain occupations have been found to have peculiar patterns of interest in a great variety of things not ordinarily associated with occupational adjustment. A Vocational Interest Blank, which discriminates among persons engaged in these occupations, has been prepared and widely used. Dr. Strong reported the latest developments in his work in the *Symposium on Analysis of the Individual*

in April *Occupations*. The Carnegie Corporation has made a grant for further research on this problem.

V

EVALUATION OF THE GUIDANCE PROCESSES

Vocational guidance, as a recognized phase of education and a conscious process, is about a quarter of a century old. The processes have developed out of the thinking of people in school, industry, and social welfare activities, who have been interested in the happy occupational adjustment of individuals. Out of what has been learned of the teaching processes, of psychological testing, and of business and industrial personnel practices, there have arisen various practices. Up to two years ago very little had been done to evaluate their effectiveness. Since then Grayson N. Kefauver and Harold C. Hand, under a Carnegie grant, have conducted evaluation studies in nine cities. Some of the results have already been published in *Occupations*. A study of the effectiveness of the teaching of occupational information, made by Mildred E. Lincoln, also was published in the magazine. Both of these studies revealed few measurable differences between guided and unguided children. The ten-year follow-up study of Edward L. Thorndike, now published, reveals practically no significant relationships between various measures of human abilities and certain criteria of success. These results are disconcerting. If the present techniques of guidance are not achieving their objectives it is imperative that the facts be recognized and faced, in order that new techniques may be devised and subjected to experimental application. Hence the following projects:

1. *Stanford University—Evaluation of Guidance Procedures on the Secondary Level.* There is being set up, under as nearly ideal conditions as possible, the best known techniques of guidance, to the end that the greatest potentialities may be canvassed. This step is being taken in the Frick Junior High School in Oakland, the Eliot Junior High School in Pasadena, and in the schools in Providence, Rhode Island. By the use of control groups it will be possible to evaluate the results.

2. *NOC—An Evaluation of Adult Guidance in the Adjustment Service.* At the request of the Adjustment Service, NOC is making an evaluation study through two of its members, John A. Fitch and C. S. Coler. An independent study has been made by Donald G. Paterson, Chairman of NOC Technical Committee.

VI

AN EXPERIMENTAL PROGRAM

In February *Occupations*, especially on pages 25 and 43, are suggestions which have grown out of the studies conducted for NOC by Drs. Clark and Bingham. They are concerned with community planning and guidance. They contain elements which have never before been tried in a community. The validity of the processes can be determined through experimentation. It is proposed that by a combination of the two procedures described in the articles the experiment be carried out in several typical communities, probably Rockland County, Providence, a rural section in the South, a large city like New York, and a small town. A coordinator under the supervision of NOC will carry the technical information into the various communities. A grant has already been made to Rockland County, another has been made for the services of the coordinator, and a third is being requested for services required in the production of technical information.

VII
DISSEMINATION OF INFORMATION

Throughout the country, school people —administrators, teachers, counselors— are almost literally crying for information on the various phases of guidance. Inquiries range from the casual "Tell me everything about guidance" to the most intelligent requests for definite help in specific situations. There is no phase of NOC activity that seems more clearly indicated than the information service.

1. *Occupations, the Vocational Guidance Magazine.* By agreement with the National Vocational Guidance Association, NOC took over the publication of *The Vocational Guidance Magazine*, beginning with the issue for June, 1933. A new and enlarged format was designed, and the name changed to *Occupations, the Vocational Guidance Magazine.* Since June, monthly issues dated October, November, December, January, and February have appeared, making six already published under the auspices of NOC. Volume 12, comprising ten numbers will be completed with the June issue. (Volume 13 will comprise nine numbers, running from October, 1934, to June, 1935, inclusive.)

The magazine continues to serve as the official organ of the National Vocational Guidance Association and at the same time it serves NOC as a medium for disseminating information of various types, such as have been described in the preceding pages of this report, and as a means of acquainting readers with the activities and plans of the organization. As a news magazine, it seeks to provide a running record of events and developments in the whole guidance field, including reports of conferences, notes on current researches, and reviews of new books. Beyond its informational function, which is performed through its feature articles as well as through its special departments, the magazine is a forum of discussion wherein are recognized the claims both of theory and of practice.

Fred C. Smith, as editor, is assisted by an editorial board consisting of the three staff executives of NOC, and by a group of associate editors—Arthur J. Jones, Harry D. Kitson, Mildred E. Lincoln, and Morse A. Cartwright—the first three of whom are members of the NVGA Committee on Cooperation with NOC. These groups together constitute an editorial council, which meets periodically on call of the editor. Three meetings have been held, at each of which suggestions were offered and discussed for making the magazine as interesting and useful as possible to all classes of guidance workers, especially the "working counselors." The members have worked in great harmony as an advisory body in matters pertaining to the selection of material and sharper definition of policies.

The successive issues of the magazine reflect these counsels. Articles of a variety of types have been published. Some have been chosen for their value as presentations of underlying philosophy or as background material of general social, economic, or educational significance, such as those contributed (by request) by Dorothy Canfield Fisher, Frances Perkins, and Dr. I. M. Rubinow. Others have borne more directly on counseling problems, such as the article on "Opportunities for the Physically Handicapped" by Louise C. Odencrantz and Seville Millar, and that on "Vocational Guidance for Negroes" by Ira De A. Reid. A suggested program for "Guidance in Small High Schools" was offered by Knute O. Broady and Elgin D. Clason. There have been reports of specific in-

vestigations and researches, including preliminary papers from Dr. Kefauver relating to his studies in the evaluation of guidance programs; a paper by Mildred E. Lincoln on "Measuring Outcomes of the Course in Occupations," and an article by Edward L. Thorndike summarizing the results of his ten-year follow-up study.

"The Guidance of Youth in Colleges," by Karl M. Cowdery, was the introductory article of a series on college personnel work; the second article, by Edith G. Stedman and Mary E. Manson, described the Radcliffe Plan of "Vocational Tryouts for College Students." A series of articles under the general head of "New Frontiers in Occupations" was initiated by President Morgan of Antioch, and will deal with new or undeveloped fields of opportunity, many of them in the public service. Other series are projected, as for example, one on vocational guidance in foreign countries. The issue for February was a special number on "Occupational Distribution and Trends," under the editorship of Bingham and Clark; this is intended to serve as a source-book or textbook on this subject. Arrangements have been made for subsequent special issues of like character on different subjects.

In the January issue, the Director, in his article entitled, "The Good Life and the World's Work," gave a comprehensive overview of the varied, interrelated problems of guidance and adjustment of concern to NOC, showing the job to be done not by NOC alone but also by the concerted and continuous effort of all interested and responsible groups. The NOC bibliography has been described in the magazine, and it is planned to supply bibliographical material on particular topics through its pages. Conferences held under the auspices of NOC—as that at the Hotel Roosevelt in April, 1933, and the Northeastern Regional Conference at Johnsonburg in August—have been rather fully reported. A department called "NOC Clearing House" contains news of field and other organization activities. "Keeping the Record" is a department reserved for news of the NVGA branch organizations and for reports of the NVGA Committee on Legislation.

The editors are eager that the magazine should be worth to the subscriber all that it costs to produce it. Although they have felt that no phase of guidance work is outside its scope of interest, and that the interest of every group of guidance workers should be regarded in shaping policies and carrying out plans, they have formally recorded their belief that the workaday needs of working counselors should have *first* consideration—and consideration *all* of the time. They have had constantly on their minds, too, the problem of effecting a proper balance between technical matter, more or less statistically presented, and material of a more generalized nature and treatment. As yet they do not feel that they have made the magazine all that it might and should be as a professional journal appealing to all who are interested in guidance and adjustment problems and thoroughly useful to the workers in this field. In this sense, they are not satisfied with their job.

2. *The Consulting Service.* Announcement in a few educational magazines of the organization of NOC and its desire to be of service to persons interested in occupational adjustment brought from colleges and secondary schools a flood of inquiries which at times threatened to overwhelm the staff.

To meet this demand NOC has prepared special brief bibliographies of in-

formation about guidance at various levels and has undertaken to obtain for *Occupations* a series of articles which would be helpful to workers in the field. Selected articles are reprinted and sold at cost to those who request them. A list of these reprints and bibliographies is sent with the reply to each vague request for general information, and the inquirer is invited to come back for further help if NOC may be of service to him on any specific problem. When the specific problem is given in the original or in a second letter, the answer from NOC may range from a few lines of pertinent references to a two or three page letter containing detailed information and counsel. Those of the latter type constitute about ten per cent of the total correspondence of this character.

Persons in the vicinity of New York, and others who visit New York, call frequently at the office to present their problems in person. One hundred and twenty-four callers have desired specific consultative service. Some individuals have paid many visits. This number does not include the numerous applicants for positions or the casual callers. Replies to inquiries received by mail, from persons in the metropolitan area, always include an invitation to call at the office.

Staff officers are available as consultants to educational institutions and visit such institutions upon request whenever the institutions offer to defray the necessary traveling expenses. In view of the drastic reductions in educational budgets which have been made during recent years, few such calls are anticipated. Despite these limitations, however, visits have been made under these arrangements to secondary schools and colleges.

During the past year, the chief executive officers of ten state departments of education (Arizona, California, Minnesota, Missouri, Nevada, New York, Oregon, Pennsylvania, Utah, Virginia) have indicated their willingness to have referred to them all such requests which come from their states. Suggestion for such cooperation has been made by NOC only after personal contact has been made with either the executive officer or a representative of the state department, chiefly through regional conferences. This has been a slow process, but has been considered much more effective than the writing of a formal, blanket letter, which would probably bring an affirmative response but no understanding or enthusiasm.

There has been considerable urge in various communities and organizations to further the aims of vocational guidance, but it is often felt desirable to commandeer the prestige of a national organization or of an outside speaker. The demands for this type of service have been met wherever the local organization has been able to pay the expenses incident to travel.

3. *Regional Conferences.* The very nature of the conference makes it exceedingly difficult to analyze its values and segregate its benefits, for they do not lend themselves to statistical evaluation. Judged by the number and the earnestness of the favorable comments which have been passed upon the Northeastern and the Western Conferences, they seem to have developed keen interest and considerable understanding. We shall not be content, however, with these friendly expressions of good will, but at the end of this school year we shall attempt, through an inquiry among the participants and among the institutions or communities in which they operate, an inventory of programs or events the origin or stimulation of which may be reasonably attributed to the Regional

Conference. There have, of course, been valuable by-products. Emphasis has been laid upon the desire of NOC to stimulate and promote the growth of independent, homogeneous groupings of persons interested in the occupational adjustment of youth. The regional conferences have afforded an opportunity for making this attitude known to a great many different persons over wide areas.

The original idea of these conferences was to bring to the "working counselor" the latest, most authentic knowledge in the field of guidance. This goal has been kept foremost in our minds, but in the development of our plans many other goals have appeared worthy of attainment. Some of them have been:

Enlisting the interest and support of school superintendents.

Bringing technicians together with one another for the threshing out of differences and agreements.

Bringing technicians together with guidance practitioners, for the subjection of theory to the test of counseling experience.

Contact of counselors on the various occupational levels, to the end that they may understand that they are all dealing, at different ages, with the same boy or girl.

Challenging research workers with the direct and vigorous criticism of other investigators whose experience reveals flaws in otherwise impressive investigations.

Facing broad social and economic problems and adjusting guidance activities to recent social changes.

Development among all groups in the guidance movement of a spirit of impartial evaluation of present techniques and a willingness to modify current practices in the light of research.

Development of friendships among guidance workers. This was especially noticeable at Camp Stevens, where ten or twelve persons lived for a week in each cabin. Such personal contacts may start exchanges of experience and cooperative relationships which will do much to further both research and service.

(a) *The Northeastern Regional Conference.* This was fully reported in the November number of *Occupations.* Anticipating the returns which we hope to get from a careful inquiry, we now note the following specific outcomes:

(*1*) The tentative organization of a Pittsburgh Occupational Conference. The techniques of the Northeastern Conference were used in a three-day conference to which the Director was invited. This was reported in November *Occupations,* page 52.

(*2*) The Minnesota State Conference, planned by Donald G. Paterson on his return from the Northeastern Conference. This was reported in March *Occupations,* Section One, page 55.

(*3*) An entire session of the autumn conference of the Eastern College Personnel Officers was devoted to NOC; it concluded with a vote to cooperate fully with NOC. The meeting was reported in the December issue of *Occupations,* page 62.

(*4*) The organization of the Western Massachusetts Branch of the National Vocational Guidance Association seems to be due partly to the interest aroused in the persons from Springfield who attended the Northeastern Conference.

(b) *The Western Conference.* The quality of the material presented at this conference was so high that it seemed unwise to lose the record of it. Under the general title, "New Frontiers in Guidance," the papers and reports were published as a supplement to the March issue of *Occupations, the Vocational Guidance Magazine,* and in this form constitute a useful, up-to-the-minute textbook in guidance.

VIII
COORDINATION OF PERSONNEL ASSOCIATIONS

In response to a request from the American College Personnel Association, the Carnegie Corporation made a grant to be applied to a project for the coordination of the activities of various personnel associations. Under the general supervision of the Director and the direction of Dr. Bingham, joint programs were developed for the February conventions. All correspondence emanated from the NOC office.

We may now add as a postscript that these associations voted at Cleveland to appoint representatives "to undertake the formation of a more permanent and stable agency—something in the nature of a national council of guidance personnel associations—to carry forward joint planning and cooperative action." Officers of the several organizations met later and unanimously agreed to proceed with the formation of the council. To this end the Chairman of the Committee on Joint Planning, Dr. Bingham, was asked to call a meeting of the representatives of the several associations in New York at an early date, in order that the work of the coming year might be forwarded promptly. The organizations in New York which will be represented are:

American College Personnel Association
National Association of Deans of Women
National Federation of Bureaus of Occupations
National Vocational Guidance Association
Personnel Research Federation
Southern Woman's Educational Alliance
Teachers College Personnel Association

IX
ADVISORY SERVICE ON REQUESTS FOR GRANTS

During the year 54 requests for grants have been placed before NOC for advice.

Favorable action has been recommended on 10
Unfavorable action has been recommended on 28
Still pending 16

Before coming to a decision on these requests, the best possible counsel has been sought. The principal source has been the Technical Committee. Assistance has been obtained also from the Committee on Women's Occupations. Every effort has been made to determine whether the results of each study would contribute to the furtherance of the objectives of NOC. The time and energy expended by the staff on these grant requests have varied from an almost negligible amount to a great many hours of reading, study, consultation, and conference. The task has been considerably lightened by the action of the Executive Committee in adopting certain general guiding principles.

X
ORGANIZATION OF THE OFFICE

Office procedure has been organized to provide effective service. Files and records have as far as possible been set up to give us as expeditiously as possible such information as the following:

(a) Key people in guidance work.

(b) Types of service and to whom rendered by NOC—requests for information, requests for articles and/or speeches, service interviews. Requests for information are assembled geographically so that if a trip is taken to one locality the neighboring centers may be noted on the itinerary.

(c) Magazine subscribers—by locality, and whether renewals or new subscriptions—with key people among the sub-

scribers especially noted so that requests for guidance information or help in organizing a branch can be referred to them.

(d) A subject file index to pertinent information in the fields of vocational guidance, occupational trends, etc.

(e) Library of general reference books and of specially recommended references.

(f) Card bibliography of occupational references and information.

(g) Library of pamphlets and miscellaneous material, catalogued by author, subject, and title; also by publisher where the publisher constitutes a group or an organization of interest.

XI

GLIMPSES INTO THE FUTURE

Early in the year (April, 1933) the members of NOC gathered in New York City for a two-day conference at which plans and possibilities were discussed and definite suggestions for a program of action were formulated. Reports of the meetings were published in the June and October issues of *Occupations,* under the title "A Conference in Conference." Out of the regional conferences already mentioned have also come many helpful suggestions for the consideration of the Executive Committee and the staff. Other scattering suggestions have emanated from various sources. The briefest possible listing of the more significant of all these would occupy several pages. They may, however, be classified under a few principal heads.

Suggestions referring to *Research* call for studies of occupations and occupational trends, of individuals in relation to occupations, and of the organization of guidance in cities, rural areas, and states. They embrace dozens of particular aspects of these general problems, such as the techniques and methods of counseling, the measurable results of guidance procedures, practices, and programs, and the organization of guidance on different educational levels, from the junior high school to the university. Much of the emphasis is on evaluation, as evaluation of entire guidance programs; some of it is on psychological tests and testing; some on the guidance needs of adults and on guidance opportunities outside the school system. Stress is laid, too, on the need for coordination of research activities in this field, whether under governmental or private auspices; and specifically, the need for comparable classifications and terms in job analysis studies on the one hand, and studies of individual analysis on the other.

Under the head of *Dissemination of Information,* numerous suggestions relate to publication of occupational information, and of information about guidance methods and procedures through the magazine and through books, pamphlets, and leaflets. The pamphlets and leaflets would be designed, in some instances, for the use of counselors, and in others for the use of pupils or of parents. Brief bibliographies on various topics for different groups of readers have been suggested, these to be published in the magazine, in circulars, or in mimeographed form. Study of the radio and of motion pictures as instrumentalities of guidance has been proposed.

Coordination of Organizational Activity is deemed an important problem to the solution of which NOC can contribute, and indeed is regarded by many as one of the prime reasons for its establishment. The suggestions for attaining this end range from joint meetings and conventions to a planned redistribution of functions, or a new "division of labor," among the numerous organizations operating in the guidance and personnel field. They have to do not only with research

but also with publications, and with the relationships not only between private and public agencies, but also among the various governmental units — federal, state, county, city, town—on the basis of which, in connection with the schools or otherwise, guidance activity may be organized or occupational research conducted. This aim implies a close working contact between agencies concerned with research and those concerned with the vocational guidance and adjustment.

While NOC does not exist for purposes of propaganda, its members and cooperators feel that it can do much for the *Furtherance and Stimulation of the Guidance Movement,* particularly through pointing out and critically examining such needs as that for guidance service in rural areas and country schools, and through helping to deflate the claims made for vocational guidance by charlatans and commercialists and by unscientific enthusiasts. It can help, within the movement itself, to promote the scientific spirit without detriment to its human motivations; it can assist in broadening the social and economic outlook of guidance workers; and it can aid in efforts looking toward the professionalization of guidance and of guidance personnel.

Scores of suggestions, such as these, representing to a large extent both need and demand on the part of leaders and workers in the field with which NOC is concerned as a guiding, helping, integrating, cooperating, stimulating force, have come to the attention of the Executive Committee and the staff. All are constantly kept in mind, many have received careful consideration, not a few have been adopted and are being carried out. It is, of course, impossible to do everything that might or ought to be done, all at once. The program has to be selective, and to some degree both opportunistic and experimental. The record of the first year indicates the general direction in which we are headed. It is our purpose to go on as we have begun, with some additions in the way of specific activities, and, we trust, with evidence of growth and maturity in fulfilling both the letter and the spirit of the objective which has been committed to us and to which we are committed.

This is not the place for laying down another program, either for the second year or for the longer future. By the time this reaches the reader's hands, indeed, the second year's work will have been in progress for several months. We may note, however, a very few of the items of activity included in plans for the immediate future. Publication of the magazine will be continued. Among the special numbers that have been planned, one, a symposium on "Analysis of the Individual," under the editorship of Donald G. Paterson, will appear in April; a second, on "Analysis of Occupations," edited by Morris S. Viteles, will appear in the June issue; a third, on "Mental Hygiene and Vocational Guidance," to be edited by Drs. Ira S. Wile, George K. Pratt, and Frank J. O'Brien, will appear in November. NOC bibliography will be published in book form; it will be kept continually up-to-date in the files, and current additions will be published from time to time in the magazine. A regional conference similar to the Northeastern, the Western, and the Southern is being arranged for the Mid-Western States. Plans for a conference of Negroes on problems of guidance for Negroes are being developed. The consultation service, both in the office and in the field, is a growing feature of our work, both in amount and in value. Other continuing interests and activities are indicated in the previous pages of the report.

The chart devised to furnish a comprehensive view of "The Field of Occupational Adjustment," which accompanied the article on "The Good Life and the World's Work" in the January issue of *Occupations,* has proved helpful as a means of visualizing the extent to which the field has been covered, not only by NOC but also by all the various agencies of research, and of indicating parts of the field which need to be cultivated. A full explanation of the chart will be found in the article.

XII
APPRECIATION

When appreciations are richly deserved, the attempted expression of them may sound as hollow as when they are insincere. They are particularly difficult to write in this instance because the Executive Committee has been at the same time cold in its reasoning and warm in its appreciation; it has first laid every proposal bare, and after satisfying itself as to its authenticity, has bestowed it with full and complete trust into the hands of the staff. These are ideal working conditions; and whatever enthusiasm and energy the staff has exhibited may be attributed largely to the wisdom and appreciation of the members of the Executive Committee.

FRANKLIN J. KELLER
Director

TRAINING FOR LIVING

"The liberal arts college should try definitely to prepare its students to live with intelligence and good will in each of the five fields of social living," said Ernest H. Wilkins, President of Oberlin College, in a recent radio address reported by the *New York Times.* "These are the fields of home life, of earning, of citizenship, of leisure, and of philosophy and religion. The present college has done much in the preparation of its students for the last two of these five fields; but it has done far less in the way of preparation for citizenship, and it has done very little in the way of preparation for home life and for the field of earning. Yet if these latter fields be broadly enough conceived, if the need of trained intelligence and of illuminated good will in the basic relations of life can be fully recognized, I can see no reason why preparation for life in these relations should not find its place within the effort of the college."

KEEPING THE RECORD

News of the National Vocational Guidance Association Branches

Edited by
ROY N. ANDERSON

Providence, R. I.

The January meeting of this flourishing Association consisted of a symposium on "Industrial Opportunities."

Thomas A. Dowd, Personnel Manager of the Narragansett Electric Company, discussed his methods of selecting employes and their opportunities for advancement. Byron Fleming, General Manager of the Providence Division of the First National Stores, outlined chain-store organization and the types of employment open to untrained workers. Albert Hanson, Superintendent of the George Berkander Company, a large jewelry novelty concern, discussed types of factory work.

All speakers agreed that the only basis for selecting employes is the personal interview—personal appearance and an attractive personality being the deciding factors. Character qualities of promptness, responsibility, and the ability to get along with people, rather than any specific school subjects, were the fundamental requirements for industrial success.

Maryland

For a number of years, outside speakers on occupational information have played an important part in the guidance program of the public schools of Baltimore. It has been the opinion of some of the speakers and those interested in the guidance program in the schools that much could be gained by a meeting of the various speakers which would give unity and strength to the contribution these men and women were making. Such a meeting was called in February. One hundred persons accepted the invitation. They represented 40 fields of work. The counselors of the secondary schools also attended the meeting. Charles W. Sylvester, Director of Vocational Education, presided. An introductory address was given by David E. Weglein, Superintendent of Schools. Leona C. Buchwald, Supervisor of Guidance and Placement, spoke on "The Guidance Program in the Schools." C. F. Merriam, an engineer of the Pennsylvania Water and Power Co., dealt with "The Contribution of the Outside Speaker."

After the presentation of these subjects, the meeting was opened for discussion. A committee was appointed to study further the problem of utilizing outside speakers in a guidance program. The creation of a council of agencies in the community which are concerned with guidance is contemplated.

At the March meeting of this Branch, Miss Buchwald, Supervisor of Guidance and Placement in the Baltimore schools, gave a brief account of the Cleveland convention of the National Association. Mrs. Harrison, the President, introduced the speaker of the evening, Mary V. Robinson, Director of Public Information, Woman's Bureau, U. S. Department of Labor, who spoke on "Occupational Trends and the Progress of Women."

New England

John F. O'Brien, of the Boston office of the NRA, gave an interesting talk on the economic philosophy and practices of the new social order, stressing the problems which face the educators.

Dallas

The annual meeting of the Dallas Association was held in February with about 50 in attendance. J. J. Brown, Director of Vocational Rehabilitation of the State of Texas, spoke on the methods and results of rehabilitation work in Texas and the possibilities of its being applied to vocational guidance in factories, schools, and social service organizations. Mrs. B. C. Bowen, representing the North Texas League for the Deaf, spoke on the subject, "The Problem of Rehabilitating the Deaf." Frances Alexander, President of the Professional Women's Club, gave a brief explanation of a recent project sponsored by the club, which sent speakers to the high schools throughout the city to speak on guidance in any chosen field.

Wisconsin

The annual mid-year meeting was held at the Milwaukee Vocational School auditorium, with an address of welcome by M. C. Potter, Superintendent of Schools, Milwaukee. R. A. Beckwith, Superintendent of the Koehring Company, Milwaukee, followed Mr. Potter with an address on "Technical Progress." Otto Kowalke, Professor of Chemical Engineering, University of Wisconsin, spoke on "As One Counselor to Another" before a group of 350 at the luncheon meeting. His talk was a record of his own experiences in counseling with freshmen entering his department at the University.

In the afternoon the following group meetings were held: (1) Statistics in Guidance, (2) Case Studies, (3) Predictive Methods, (4) Group Conference Methods, (5) Selection and Placement, (6) Teaching Occupations, (7) Apprenticeship.

On February 19, William M. Proctor, Past President of the NVGA, spoke on "A Follow-up Study of 900 High School Students."

Teachers College, Columbia University

The Teachers College Branch held a tea on March 3. The 16 members who attended the national convention at Cleveland gave short reports. In April the Branch presented the Seventh Annual Guidance Follies, with an attendance of about 100, including guests from the New York City and New Jersey Branches and from the recently organized Westchester County group.

Southern California

At the February meeting C. R. Briggs gave a detailed report of the newest developments in California educational legislation. Victoria McAlmon, Placement Secretary of Los Angeles Junior College, presented the placement problem of junior college and college graduates. She pointed out that the crying need of placement secretaries and young people seeking employment is more complete and up-to-date information about occupations. A panel discussion was opened by Mr. Amsden, of the County Civil Service Commission. Others who participated were Miss Jaehne, Mr. Putnam, Mr. Gibson, and Mrs. Moyce. Mr. Hicker of the State Rehabilitation Department explained procedures in placing handicapped people. J. Vernon Bennett moved that this Association go on record as favoring a movement to professionalize vocational, occupational, placement and personnel work, and that the president appoint a committee representing

these various divisions of the profession to draw up a tentative University Training program for those entering, or engaged in, this work.

Philadelphia

Two guidance programs were given during Schoolmen's Week at the University of Pennsylvania. They were joint meetings of Schoolmen's Week and the Vocational Guidance Association of Philadelphia and Vicinity.

The subject on Thursday, March 15, was "Adjusting the Curriculum to the Changing Social Order." Frank D. Witherbee, of Girard College, Philadelphia, presided. Addresses were given by William H. Bristow, Department of Public Instruction, Harrisburg; Albert T. Colston, Principal, Brooklyn Technical High School, and Margaret T. Maguire, Principal, McCall Vocational School, Philadelphia. Discussion was opened by William C. Ash, University of Pennsylvania.

On Friday, the topic for discussion was "The Arts Both as Professions and as Avocations." Herbert J. Tily, President of Strawbridge and Clothier, Philadelphia, spoke on "Music." Harvey N. Watts, Philadelphia art critic, discussed "Art." The claims of "Drama" as one of the arts best adapted to recreational needs were presented by Clara R. Mason, Executive Secretary of the Art Alliance, Philadelphia. "Crafts" were discussed by Mrs. Samuel H. Paul, Principal, School of Occupational Therapy, from the point of view of vocation and avocation, and also from the therapeutic angle. Discussion was opened by Arthur J. Jones, University of Pennsylvania.

Northern California

This Association held its meeting in San Francisco on March 17. Reports of National Vocational Guidance Conference were presented by William M. Proctor, Edwin A. Lee, Grayson N. Kefauver, and Marion Brown. At the luncheon, "Some Sidelights on Guidance" was the topic of Denis L. Hennessey. "Guidance on Each Level of Education—The Present and the Ideal" was discussed by Marguerite Shannan, Virgil Dickson, Harry E. Tyler, C. Gilbert Wrenn, and John F. Johnston. Members of the panel included Clyde Finger, Edith Pence, Emily Palmer, and Roy Kelly.

Harvard

"The Problem of Vocational Choice in the Liberal Arts College" formed the general theme for the discussion at the Conference on Student Personnel Problems, which was held at the Harvard Graduate School of Education in March. A. C. Hanford, Dean of Harvard College, presided over the meeting which was attended by more than 100 persons. Fred C. Smith spoke on "The Problem of Discovering Vocational Abilities"; John M. Brewer on "The Use of Occupational Information"; Phillip J. Rulon on "The Use of Tests and Inventories of Personality and Interests"; Truman L. Kelley on "Needed Research in Occupational Adjustment."

FRIENDSHIP TOUR

Susan J. Ginn, President of the National Vocational Guidance Association and Director of Vocational Guidance of the Boston Public Schools, addressed the Wisconsin Vocational Guidance Association which met at Appleton on April 28. This conference was the culmination of a "Friendship Tour" during which Miss Ginn visited schools and addressed meetings at Albany and Rochester, New York, and Milwaukee.

A dinner meeting of the Capitol Dis-

trict Guidance Association was attended by about 75 guests, including the superintendents of both the Albany and Schenectady school systems. At Rochester Miss Ginn visited schools in the morning and was "deeply impressed by the splendid vocational guidance program in both junior and senior high schools and in Kodak Park." In the evening she addressed a supper meeting of the Rochester Branch of the National Vocational Guidance Association, which was attended by many of the school principals.

Two days were spent in Milwaukee. Technical and academic high schools, including the Milwaukee Vocational School, were visited. Besides conferring individually with educational and civic leaders, she addressed the faculty counselors of the Vocational School and spoke before the Business and Professional Women's Club. The members of this club asked for suggestions as to how their club could cooperate in furthering guidance activities. They had already taken steps to establish a scholarship fund, and one member was acting as a critic of letters written by high school girls applying for jobs. Miss Ginn suggested that the women interested make occupational studies of their own jobs and prepare a booklet of the information gathered, and that members act as "big sisters" to high school girls who desire practice and training; that they take such girls into their offices and departments as observers in order to give them first-hand information of the occupations in which they are interested.

From Milwaukee, Miss Ginn went to Appleton. Representatives from all sections of the state to the number of fully 600 attended this conference. Colleges, public schools, parochial schools, and industry were all represented. The speakers at the general session were W. H. Kiekhofer, Professor of Economics of the University of Wisconsin, Judge Henry Graass of Green Bay, and Miss Ginn. As representative of the National Association, Miss Ginn explained its function as a federation of local organizations and stressed the natural interplay of interests between the central organization and the local units.

In her address on the challenge of the present educational and social crisis, Miss Ginn stressed the need of guidance at all levels from the kindergarten through educational and through professional, business, or industrial life, and the fact that these insistent demands arise from two sources—from the need created by the crisis in economic and social life, and from the need created by the diversity of educational and occupational opportunities of today. In commenting on the opportunity of guidance in the prevention of crime, Miss Ginn suggested that we follow the medical profession and place the emphasis on preventive rather than on curative measures; and she recommended that members make a study of juvenile delinquency in their several communities, with the hope of discovering where the school program has failed and what may be done to correct the deficiency.

The afternoon of the conference was given over to 12 divisional meetings in which the interests of various school and college levels as well as the interests of industry were represented, and in which the array of subjects and speakers testified to the general and intelligent interest in vocational guidance throughout the state of Wisconsin. Miss Ginn was particularly impressed as a result of her journey with the active interest of school officials in guidance aims and programs.

EVENTS – BEFORE AND AFTER

General News of the Occupational World

SUMMER SCHOOL COURSES

Notice of the courses in vocational guidance to be given this summer at Wittenberg College, Springfield, Ohio, was received too late for inclusion among the announcements of summer school courses in the May issue. During the first term, June 11 to July 14, the following courses will be given:

Principles of Guidance
Problems in Guidance
Mental Hygiene
Testing Procedures in Guidance
Psychology of the High School Student.

During the second term, July 16 to August 17 these courses will be given:

Organization and Administration of Guidance in the Public Schools
Personnel Procedures in the Public Schools
Psychology of Personality
Seminar in Guidance.

Pennsylvania State College will give courses for workers in guidance and related fields at its three summer sessions: the Inter-session, from June 11 to June 29; the Main Session, from July 2 to August 10; and the Post-session, from August 13 to August 31. Certain courses are approved for the Pennsylvania State Certificate in Guidance. Among the titles of courses are "Educational and Vocational Guidance," "Teaching of Occupations," and "Psychological Principles and Procedures in Guidance and Personnel Administration."

SOUTHERN CONFERENCE

Approximately 75 educational, social, and industrial leaders from 17 states participated in the Southern Regional Conference on Vocational Guidance and Education, held under the auspices of NOC at the University of North Carolina, Chapel Hill, N. C., April 23 to 28. In many respects similar to previous regional conferences sponsored by NOC, the meetings were marked by an eager interest and a determination to act, which resulted in preliminary steps toward the organization, on a permanent basis, of a Southeastern Occupational Conference. A detailed report of the proceedings will appear in one of the fall numbers of *Occupations, the Vocational Guidance Magazine.*

REPORTER'S NOTEBOOK

The use of guidance and occupational information in the employment office, the skills necessary in placement work, problems of finding suitable employment for the handicapped, the Negro, the domestic worker—these were some of the topics discussed at the Metropolitan Conference on Employment and Guidance Procedure by the section on Employment and Vocational Guidance of the Welfare Council of New York City, held on March 23 and 24.

The Ninth Annual Meeting of the American Association for Adult Educa-

tion will be held in Washington, D. C., May 21-24. Headquarters will be at The Shoreham. It is expected that nearly 300 educators from all parts of the United States will attend the meetings.

Dorothy Canfield Fisher, President of the Association, will address a general session on "Goals in Adult Education." There will be special meetings of representatives of community and state organizations for adult education agencies for the discussion of education for unemployed adults, vocational guidance for adults, adult education in rural districts, education for Negroes, parent education, the educational program of the C.C.C. camps, adult education in public schools, and adult education through museums and libraries.

In March about 60 Westchester workers in guidance and personnel gathered at the White Plains YMCA for a dinner meeting. Jerome H. Bentley, Director of Adjustment Service, New York City, was the principal speaker.

In 1933 the General Assembly of Pennsylvania enacted a law to control the sale of liquor in the commonwealth through a system of state stores. The law provided that the Department of Public Instruction should select by competitive examination the personnel for the operation and administration of these stores. Nine batteries of examinations and a special series for executives were prepared—relating to 33 types of positions. Because of the high competition, an exceptionally high grade of personnel has been selected. For example, out of the 244 state store managers appointed at last reports, 82 (or one-third) are college graduates. All are high school graduates and 80 per cent have had at least one year's education beyond high school. In addition, the managers are equipped with an average of 12 years of successful business and clerical experience.

Since the President's Re-employment Agreement took effect on September 1, very few employment certificates have been isued to children under 16 for industrial or commercial employment, according to reports received by the Children's Bureau of the U. S. Department of Labor from offices in 62 cities of 50,000 or more population, in 30 states, and from state offices in 10 states.

Out of 3,193 certificates issued by the offices covered by this report, between September 1 and January 1, approximately two-thirds were issued for work in the child's own home, 13 per cent were for domestic service, and 18 per cent were for the various types of industrial and commercial employment for which certificates are required.

A two-week emergency training course for placement workers assigned to the New York State Employment Service was held in New York City in April under the auspices of the Service and in cooperation with the Section on Employment and Vocational Guidance of the Welfare Council of New York City. The course was planned under the direction of Mary H. S. Hayes and Louise C. Odencrantz, and conducted with the assistance of Clare L. Lewis, Clarice A. Rosenthal, and Edna Unger.

BOOK GUIDANCE

PROBLEMS OF EDUCATION

Problems of Education in the United States. (A Social Trends Monograph.) By Charles H. Judd. New York, McGraw-Hill Company, 1933. Pp. 214. Price, $2.50.

The chapter on Education contained in the first volume of *Recent Social Trends* was prepared by Charles H. Judd of the University of Chicago. A skilful fourfold elaboration of the necessarily concentrated material of this chapter has yielded the monograph now published under the title, *Problems of Education in the United States.*

Upon the premise that "the educational system of any age or country is conditioned by economic, industrial and other social forces outside the schools," the factual evidence relating to the extension and intension of education during the past half century is set forth with forceful brevity. The data employed, statistical and otherwise, are more or less well known. Yet these have been brought together with such a discriminating sense of values as to furnish a dramatic background for the changes in the social attitude toward the American child and the American school.

The chapters on Incoordination and Instruction are likely to be regarded by many readers as containing the most fruitful, as well as the most provoking, substance of the monograph. Here the author has taken full advantage of the opportunity to restate, in convincing fashion, his well known positions toward the inefficiencies arising from the entrenched policies and practice of separatism of elementary, secondary, and higher education.

In the original chapter on trends in education appears the following comment: "A unique characteristic of the American social system which has been of importance in determining the development of American education is the freedom of choice of occupations. . . . The educational system is at liberty to arrange the education of its wards in keeping with their individual abilities and degrees of perseverance."

The social principle of this paragraph is carried over into the brief section devoted to vocational education; and again the old issues of the old rivalry of vocational training and general education are raised without, however, giving any formula for constructive peace: "Contrary to the contentions of the extremists, the experience of school systems which have organized separate technical high schools seems to justify the conclusion that the people of the United States will never be satisfied to divorce vocational training from general education."

The summary of scientific studies in the field of education, making up the final chapter of the monograph, is a stimulating inventory of the results of the efforts of organizations and individuals who have sought during the past generation to apply the scientific method to the processes, organization, and administration of American education.

Through this monograph, Dr. Judd has performed another notable service to his profession and to the civic leadership of

the country. Here and there one finds minor points for disagreement. Nevertheless, here are 200 pages, the reading of which will contribute much to sound thinking and sane action for the promotion of schools in which education will be attainable.

EDWARD C. ELLIOTT
Purdue University

WHERE GUIDANCE BEGINS?

Home Room Guidance. By Harry C. McKown. New York, McGraw-Hill Book Company, 1934. Pp. 447. Price, $3.00.

The guidance function of the homeroom is a subject of much controversy among authorities in the field of guidance. While the experts are arguing over the question, however, schools throughout the country are rapidly extending the functions of the homeroom organization. Beginning as an administrative device for the taking of attendance, the checking of scholarship, and the making of announcements, the homeroom has now become an educational institution which supplements the curricular activities in carrying out the objectives of secondary education.

Administrators are rapidly recognizing the possibilities of the homeroom, and many experiments are in operation in all parts of the country. Recent surveys, however, have shown very little uniformity of purpose or practice. This book, *Home Room Guidance,* is intended to aid experimenters in the field and to provide homeroom teachers with materials for working out practical programs.

The administration of the homeroom is thoroughly treated in Chapters II through V. Problems relating to types of program are discussed in Chapters VI through XII. Chapters XIII through XXIII are devoted to the guidance function of the homeroom activity. The phases of guidance applied to the program include educational, vocational, moral and ethical guidance, citizenship, personal relationships, health, thrift, recreation, manners and courtesy. The concluding chapter points out some of the dangers to be avoided in the conducting of the activity.

While this book describes at some length the various types of program to be found in operation in many schools, it makes little attempt to clear the atmosphere of the confusion that seems to be prevalent. The real philosophy of the homeroom is left for future development. This is one of the disappointing features of the volume. It is evident that too many things are being attempted by the homeroom organization for all to be done well. While all of these activities are worth while in themselves and may not be provided in any other way, it does not follow that the whole responsibility for their functioning must be assumed by the homeroom. The great need at the present time is for a better distribution of these responsibilities, and for a legitimate assignment of functions to the new homeroom period.

Administrators and homeroom teachers will find this contribution to the subject very helpful, but good judgment should be used in the selection of material to be adapted to any local situation.

JESSE B. DAVIS
Boston University

COLLEGE PREPARATION

Essential Preparation for College, By Luella Cole Pressey and Sidney L. Pressey. New York, Ray Long and Richard Smith, Inc., 1932. Pp. 59. Price, $0.35.

It is so easy to write a description, and

so difficult to give a prescription. Which may be why we see so many articles in professional and technical, as well as in general magazines, dealing with the reasons why boys and girls leave college, and so few telling them how to stay there.

In their manual, *Essential Preparation for College,* Luella Cole Pressey and Sidney L. Pressey have done just this. They have made a painstaking, careful analysis of the special difficulties in specific subjects in college preparation which make for failure in college; and they have told students in detail how to remedy them.

Perhaps particularly helpful is the chapter on reading difficulties, because it has such a general application and is important to so many subjects. The concrete suggestions for improving this skill can be followed to advantage by the majority of college students—and many college graduates—many of whom do not realize their own handicap. The other chapters cover languages, written English, mathematics, social science, and science.

There are few students who cannot find in this manual more than one suggestion that will make their college path an easier and smoother one to follow. Sooner or later, they will—as should all of us—take off their mortar-boards to the careful work that was put into the preparation of this useful manual.

RITA S. HALLE

New York City

ADULT EDUCATION AGENCIES

Handbook of Adult Education in the United States. New York, American Association for Adult Education, 1934. Pp. 384. Price, $1.50 to members of the Association; $2 to others.

The American Association for Adult Education has in this book compiled the first national directory of adult education agencies in the United States. To anyone who knows the variety of ways in which adult education is being carried on, it is clear at once that this is a difficult task involving nice decisions for which no precedents have been set.

The book is divided into 37 sections, dealing in various ways with adult education activity. Some sections deal with subject matter, such as music and the arts; some with groups of people, such as alumni and prisoners; some with institutions, such as museums and settlements; some with avenues of education, such as the radio and visual education; and others with training in methods and leadership. Institutions operated for profit have not been included; but vocational and avocational, formal and informal types, are here under a very catholic definition of adult education. The events of the last few years are reflected in a special section on educational opportunities for the unemployed, and in the section on vocational guidance of adults, which quite possibly might not have appeared had the *Handbook* been issued in 1929.

Each section begins with a brief article, usually a summary of the subject treated in the section. This introductory article is followed by a listing of agencies, with a brief description of the functions, arranged alphabetically by state and city. Although no claim is made that these listings are complete, all of them are adequate to give a general idea of the work done in the field. Cross-references to other sections follow the listings, and each section concludes with a very brief bibliography.

Prosaic as a directory is assumed to be, this *Handbook* may prove a shocker for people who have not realized the variety of directions which adult education has taken in recent years. For the people who have need of extensive information

about enterprises operating in this field, the *Handbook* will be an encyclopedia of useful information.

WINIFRED FISHER

New York Adult
Education Council

NEW DIRECTIONS

Needed Readjustments in Higher Education. Edited by William S. Gray. Chicago, University of Chicago Press, 1933. Pp. 283. Price, $2.00.

This monograph is the fifth of the stimulating reports of the summer Institutes for Administrative Officers of Higher Institutions which have been held at the University of Chicago. The institutes were begun in 1926 and since 1929 the various papers presented have been published.

The topic for 1933, selected because of the radical changes faced by higher institutions, includes "both temporary adjustments and permanent changes." The 18 papers discuss the nature of the emergency, and readjustments affecting instruction, organization, student life, sources of revenue, and financial management. The attitude in every one of the papers is courageous. Disturbing happenings, while not glossed over, are dwelt upon less than are new undertakings of real educational significance.

Part of the new deal in the educational field, according to Dr. Coffman, is manifested in the effort of the federal government to define more clearly its relation to education, including higher education, as in the report of President Hoover's National Advisory Committee on Education, one of the most important educational documents ever issued in America. This report emphasizes federal encouragement but not control of tax-supported institutions, a sound policy now adopted and put into action in certain respects under President Roosevelt. Many of the states, too, have been overhauling their systems of higher education in the direction of consolidation and centralization of authority. In the colleges and universities themselves, during the past three years, nearly 40 reorganizations of various kinds have occurred. Among the latter given in the book in some detail are those at the University of Minnesota, Bucknell University, and Ohio State University.

Charles E. Merriam's paper, "The New Orientation in Civic Training," should be read by every teacher of social science and by every administrative officer. Civic education, he says, faces a revolutionary change in its orientation—"the change from the backward to the forward look." The most urgent need of the time is "speeding up the rate of social inventiveness." The chapter is a stimulating one for educators and governmental officials alike.

In the section on Organization is a long chapter on "State Systems of Higher Education" by George A. Works. "The Coordination of Secondary and College Education" is discussed by Charles H. Judd, and "Standards of Accrediting Agencies," which have sometimes insisted upon unscientific and extravagant requirements, by George F. Zook, Commissioner of Education. Over a third of the monograph is devoted to financial problems. Simeon E. Leland, Professor of Economics at the University of Chicago, discusses "Taxation in Support of Higher Education." The chapter on "Student Fees" by John Dale Russell, University of Chicago, presents a series of very interesting charts based on studies of tuition fees in 40 midwestern colleges and universities from 1860 to 1932. Other curves show the lack of relation between the purchas-

ing power of the dollar and the fees in private institutions, and the slight relation in public institutions.

The monograph closes with a section on Financial Readjustment in Typical Institutions, namely a Land-Grant College, by President Hughes of Iowa State College; a Liberal Arts College, by President Rainey of Bucknell University; and Endowed Universities, by Assistant Comptroller Daines of the University of Chicago—practical, realistic, often distressing statements.

This is a book which administrative officers and faculty members can read with satisfaction and profit, whether in publicly or privately supported institutions, universities or colleges. We are indebted to the editor, William S. Gray, for bringing the papers together.

KATHARINE BLUNT
Connecticut College

MORE USE FOR POWER

The Promise of Power. By Stuart Chase. New York, The John Day Company, 1933. Pp. 32. Price, $0.25.

In this pamphlet Mr. Chase develops in his charming and interesting way the thesis stated on the cover jacket. "In its full development, electricity can yoke a whole continental economy into something like one unified machine, one organic whole. The parts may be small, flexible, located where you please, but with their central station connections. Electricity can give us universally high standards of living, new and amusing kinds of jobs, leisure, freedom, an end to drudgery, congestion, noise, smoke, and filth. It can overcome most of the objections and problems of a steam-engine civilization. It can bring back many of the mourned virtues of the handicraft age without the human toil and the curse of impending scarcity which marked that age.

"But the price of this bright Utopia is an economic system which is based on use and function, not on debt and profit," says Mr. Chase. He also says, "It is customary to approach the question of power from the point of view of industry or business or agriculture. These are all vastly important, but from a broader point of view they take second place to the promise of power for actual human living. Here lies its transcendent role in the years before us."

He discusses "a power inventory" and the small part that power as yet plays in homes, compared with what it might well play. There follows a "series of principles covering the future of power technically and humanly," for Mr. Chase never forgets the human. He lists 19 of these, but groups his discussions of them around decentralization, industry, labor, and agriculture. He concludes with a summary in which he points out trends, *i.e.,* "huge, efficient central stations," small and scattered plants, as a part of decentralization of industry and housing, changes in design and materials, resulting in "an aluminum era," and closes with some of his characteristic brilliant phrases which have been already quoted from the cover jacket.

It is an art to say as much as Mr. Chase has said, in 32 pages of large type, well spaced and margined. The result is a presentation of a series of today's problems that may well serve as a basis of question, comment, argument, and debate for many types of groups. Those who know Mr. Chase's interesting background and experience (born in New Hampshire, educated at M. I. T. and Harvard, a certified public accountant, investigator, officer of Labor Bureau, Inc., etc.) and have read him carefully, from

The Tragedy of Waste (1925) on, will add this pamphlet to his books on the well and often-read shelf that claims his contributions to stimulating thinking.

LILLIAN M. GILBRETH

Montclair, N. J.

THE CHALLENGE OF POWER

The Power Age—Its Quest and Challenge. By Walter N. Polakov. New York, Covici Friede, 1933. Pp. 288. Price, $2.00.

To a reader well versed in the history of industrial management and its technics, this book combines a brilliant exposition of what power can mean to the future, if we adapt ourselves to its possibilities, with a commentary on the history and trends in scientific management. The author emphasizes the possibilities of certain methods and devices of such management, which he (the author) advocates, uses, and has in several cases invented or adapted for a successful use of power. The non-technical reader—using non-technical here to mean one who is not a specialist in scientific management—will probably follow the main thread of the book, the use of power, and take the other material as illustrative.

The thesis is to be gathered in the Introduction, which opens: "My aim is to bring to the notice of the man in the street (the educated layman) things so obvious that they fail to attract his attention, although his very existence depends upon them." The author goes on to say: "We have outgrown the technique of the Machine Age. A new production technique, power production, characterized by bigger and better machines than those of the Machine Age, but by a different kind of machine, conditioning a different kind of production, which results in a different kind of economy and a different kind of social relations. . . . For good or evil, we have entered the Power Age, which cannot be measured by any former yardstick and in which the old relations operate no longer."

A series of interesting quotations, taken here and there, will give an idea of the flavor of the book. "The age-old quest of man for more power at a greater range has brought us at last face to face with an entirely new and unprecedented situation, and some new possibilities. It appears that the entire progress of mankind, since the world began, was merely the tuning of an orchestra before the start of the concert. If, heretofore, man had to spend his lifetime to gain the power he needed, to pay for every foot-pound gained with minutes or hours of his life; if, heretofore, man had to put more work into a machine to save a minute of time, to pay for every hour saved with more intensive labor—now at least by letting external energy do his bidding, he has an opportunity to save time to live, and to enjoy life and to realize his dreams." "The discipline of the Machine Age was man-imposed; the discipline of the Power Age is a discipline of mind complying with the laws of nature." "The times demand an 'engineering statesmanship' that will guide itself and the affairs of state in scientific light by scientific means." And as a particularly happy phrasing expresses it, "Thus at length we come to realize that what we suffer from is not technological unemployment but the Unemployment of Technology."

A large number of the group interested in scientific management will follow and agree with the argument for the right development of the possibilities of the Power Age. Not so many will agree with the comments on scientific management itself—on skills and motion habits. However, the author's feeling that data

on production are inadequate, that a planned economy is possible and advisable, and that standards free the user, naturally meets agreement. The last point is illustrated by an especially happy analogy when, speaking of the fireman whose work has been submitted to thorough tests and research, he says, "Is he free, or a slave of these standardized requirements? If he disregards them, he is erratic; if he disobeys them, he is a maniac; if he follows them, he is free, for it means that he acts in accordance with universal laws and that he has truly under his control the enormous powers of nature."

One could go on almost indefinitely, but it is better to stop quoting and urge that the book itself be read.

LILLIAN M. GILBRETH
Montclair, N. J.

GUIDANCE AND ENGINEERING

Vocational Guidance in Engineering Lines. American Association of Engineers. Erie, Pennsylvania, Mack Printing Company, 1933. Pp. 560. Price, $2.50.

Fifty different engineers describe as many branches of their profession. All of these men are prominent in their fields and have seen the problem with which young men are faced as they decide for or against engineering. Most of the authors have anticipated questions that their particular branches will raise. They add a general picture of the given specialty, suggestions on the type of training required, a description of the type of man best fitted for the work, and an outline of the difficulties to be encountered. In most cases an estimate is given of the remuneration and opportunities to be expected by one entering the profession at the present time.

As might be supposed with so many contributors, there is considerable repetition of advice to the prospective engineer. Two points in particular receive this attention: the importance of written and spoken English and the advisability of a general course in engineering before specialization.

In the concluding chapter of the book the editors have summarized the opinions of the contributors. In addition they have assembled the preceding admonitions and counsels into their "Ten Commandments" of engineering. It is well to remember that this book will serve its most useful purpose if it is read by the young man searching for information. If he is earnest in his desire for information, he will find it here or will learn where it may be found.

So, while there may be criticism of this book for its length or its repetition or even for some of the advice offered, it will remain valuable as an aid to those seeking the answer to "What shall I do?"

WESLEY T. HARRISON
Stevens Institute of Technology

KENTUCKY MINERS

Machine Age in the Hills. By Malcolm Ross. New York, The Macmillan Company, 1933. Pp. 248. Price, $2.00.

With Kentucky coal miners in the forefront, Malcolm Ross, in his *Machine Age in the Hills,* presents the especially disturbing problem of occupational maladjustment, which mechanization, plus certain human factors, has brought about in the coal mining industry, as well as in so many other economic situations. The Kentucky miners are chosen to illustrate a more or less national problem in the industry.

The problem which they represent awaits some basic rescue from a situation in which we are confronted by twice as

many miners as would be needed again even under conditions making normal resumption of mine operation possible.

What really effective aid does Mr. Ross see as possible for these desolated, bewildered miners? Not "drawing room charity" or charity at all, effectively as the Friends have administered relief as a temporary measure. Not communism which the deeply rooted fundamentalist religion of the Kentucky miners is already rejecting, and not unionism, until enough of the miner representatives have been sufficiently educated to hold their own in dealing with the capitalistic group. Vital administrative problems in the industry itself await adjustments calling for such representatives.

As to other means of occupational adjustment, in view of the large surplus of miners under any conditions, Mr. Ross sees solutions or alleviations rather closely resembling plans announced by the Tennessee Valley Authority for dealing with surplus population in its area: further division of mining opportunities by shortened hours; a farm, with a garden and a small crop for each family, both as a refuge during unemployment and for supplementary maintenance at all times; probably some supplementary industry too, whether home crafts, reforestation, or something else discoverable.

The suggestion which chiefly captures his interest, however, is that of a penny-a-ton tax which shall be devoted variously to improvements in health and educational conditions, to needed social and economic research, and to other local upbuilding in behalf of this devastated group.

From several directions comes the assurance that Kentucky miners and operators both consider the book a fair representation. Everything considered, one must give Mr. Ross credit for an unusual achievement.

O. LATHAM HATCHER

Richmond, Virginia

NEW EMPHASES

Personnel Administration **(Third Edition).** By Ordway Tead and Henry C. Metcalf. New York, McGraw-Hill Book Company, 1933. Pp. xiv, 519. Price, $4.00.

In this revision the authors have "placed added stress on certain unsolved problems," especially those growing out of the present depression. In their opinion, "the following matters require most urgent attention and constructive thinking": (1) security of employment, (2) education in industry for effective personalities, (3) representation of labor in deliberations on policy, (4) broadening the objectives of industry so that "workers will feel safe and benefited by espousing them," (5) admission of workers as "more nearly equal partners."

The following excerpts suggest the attitude of the authors toward industry's responsibility to the workers: "Whereas property can outlast the suspension of payment for its use, human beings cannot outlive suspension of their income beyond a very limited period. . . . No organization can really solve its problem of securing interest, loyalty, and enthusiastic cooperation from its members until it is assuring them in a definite way work the year round (or some compensation in its absence). . . . Legislation to require dismissal payments following the European experience may prove to be helpful and wise."

Discussing technological unemployment, the authors describe as "bland and unrealistic" the argument that in the long run displaced workers tend to get placed. They suggest three possible solutions:

(1) direct relief, (2) employment on public works, (3) general reduction of hours.

The basic problem in cyclical depressions is to provide a broader distribution of purchasing power. "How this basic problem of assuring a more effective, regular and universal distribution of purchasing power throughout the entire consuming community can be made to take place is perhaps the outstanding challenge to the so-called 'capitalist system.' There is wide disagreement as to what the solution may be. But the likelihood of reducing the recurrence and lessening the severity of business cycles is tied up with the answer to this larger economic problem of a better distribution of purchasing power."

R. H.

CHINA AND CAREERS

Careers for Students of Chinese Language and Civilization. By Louis Hodous, Editor, Kenneth S. Latourette, Julean Arnold, Esson M. Gale, Nathaniel Peffer, Y. C. Mei, Berthold Laufer, Benjamin March, Arthur W. Hummel, Charles S. Gardner, Lucius C. Porter. Chicago, University of Chicago Press, 1933. Pp. 65. Price, $0.25.

This pamphlet should be on the shelves of all college deans and college vocational guidance workers. They will want to put it in the hands of internationally minded students, those with superior ability and education. The person interested in the Orient and how contacts between the Occident and the Orient are made will also want to read it.

The careers described are divided into three groups. The first includes professors of the social sciences in colleges and universities in the West who can enrich the content of their courses by a knowledge of Chinese culture. The second group consists of those who go out to China as business men, teachers, government officials, and missionaries. The third group are the research workers who investigate and interpret Chinese culture to the West.

The authors have all had long experience in things Chinese, most of them having lived in China much of their lives. They speak with a sure knowledge. They have been frank concerning the high qualifications required, the comparative scarcity of openings, the moderate salaries and the rich compensations which come from living in the far places of the earth. However it seems to the reviewer that one difficulty was omitted which should have been mentioned, i.e., the uncertainty of both salary and tenure of office in any career which is entirely under the Chinese government.

The value of the book as a source of information would have been considerably increased if more addresses had been given. The student who becomes really interested in one of the careers mentioned will doubtless find a way of obtaining further information, but in the book he will find only one address to which to write.

MARJORIE RANKIN

CAREERS FOR WOMEN

Careers for Women. By Catherine Filene. Boston, Houghton Mifflin Co., 1934. Pp. xiii, 620. Price, $3.00.

For fourteen years the first edition of Catherine Filene's *Careers for Women* has been one of the indispensable tools of vocational counselors. Even after it was obviously out of date, it still enjoyed wide popularity because there were so few other books covering such a wide variety of occupations in such well organized fashion. Considering the fact that this volume has been on the market since

1920, it seems amazing that more subsequent authors have not followed the excellent example it sets in matters of organization and presentation.

In most books on occupations the reader who is interested only in the preparation required or in some other bit of information must read the whole book just to get this information. But in *Careers for Women* each particular section is appropriately labeled under such headings as the following: description of activities, qualifications for success, age span, advantages and disadvantages, supply and demand, training necessary, financial return, advancement, suggested reading. In this manner are covered more than 150 occupations, under 23 classifications including agriculture, arts, business, dramatics, education, engineering, science, government, health activities, home economics, industrial work, international relations, law, library work, literary work, the motion-picture industry, music, politics, public relations, radio, scientific work, secretarial work, social work, and transportation.

More than 150 authors have contributed to this symposium. They include four members of the National Occupational Conference: Lillian M. Gilbreth who writes on the industrial engineer, Katharine Blunt who describes the work of the college president, Chase Going Woodhouse who describes opportunities for dentists and for deans of women, and Frances Perkins who explains the work of the factory inspector. Other writers, well known to people in the guidance field, include Mildred E. Lincoln, who describes the work of the vocational counselor in public schools; Mabelle B. Blake, who discusses the personnel director in colleges; Bess Goodykoontz, who describes in general the occupations in the field of education; Ruth Yeomans Schiffman, who outlines opportunities in home economics; Edith Stedman, who describes the work of the college appointment secretary; Dorothea de Schweinitz, who tells about public employment officials; and Florence Levy, who presents a stimulating list of opportunities for women in the design arts.

This is no simple modification of an old manuscript. Instead the book has been completely rewritten. Some of the occupations in the new volume scarcely existed when the old one was published. Radio, for example, is not even mentioned in the index of the original publication, while six articles in this field appear in the revision. It seems safe to predict that the book will enjoy a popularity rivaled only by the previous volume of the same title.

R. H.

SELF-SALESMANSHIP

Selling Your Ability. By T. S. Knowlson. New York, Esser-Frederick, Inc., 1933. Pp. 297. Price, $3.00.

Anyone who is intimately acquainted with either the vocational guidance or the personnel field will find many things in this book which will arouse ire and some evident misstatements. Nevertheless, most of the volume is based on sound common sense and there is no evidence of quackery. If the author had stopped on page 134 instead of 298, the book would have been pertinent, compact, and adequately factual. The last half, which deals with such topics of vocational guidance as "aptitudes and choice," tests, and allied subjects of interest to professional people dealing with such matters and to parents, is not so well done. The parents may be misled by this material and the others will not learn anything new.

However, to a person who is genuinely

interested in the various means to be used in selling one's services this book ought to be informative and somewhat stimulating. The author brings out clearly the value of treating the question as a selling problem, and he presents the various means to be used, especially types and forms of advertising. Though it may be felt that he has overstressed advertising and undervalued the aid which employment agencies can and sometimes do give, it is possible to disagree and yet regard the material as worth while.

It is by no means a scientific work, nor is it, apparently, intended to be. It is written for popular consumption in a readable and fairly interesting style and, if one can sort the wheat from the chaff, provides another point of view on a difficult yet important problem of our day.

SAMUEL S. BOARD
School and College Counselors, Inc.

GETTING A JOB

Your Job—How to Get It and How to Keep It. By R. O. Pickard. New York, Dodd, Mead and Co., 1933. Pp. 240. Price, $1.75.

This is another book to be added to the increasing number of volumes telling individuals how to sell their services. After opening with a very weak chapter on how to choose a vocation the author is at home in his own field and gives definite and concrete suggestions regarding the following: how to locate an opening, preparation for the employment interview, and techniques of the interview. Some excellent advice is given the individual as to what to do and what not to do after the job is secured. The traditional generalities are dealt with regarding promotion after securing the job.

Several portions are included which seem to serve as fillers for the book. For example, the chapter entitled, "What Various Fields Offer" is limited to opportunities in the hotel, manufacturing, and chain-store fields. It would be better to have the individual consult occupational studies for these occupations than to treat them in cursory fashion.

An interesting feature in the book is a list of specific questions and answers. The book will serve as correlative material when the class in occupations is discussing the question of "how to get a job." Laid on the table in the reception room of an employment office, it should be useful to prospective job-seekers to thumb through as they are waiting to be interviewed by the placement secretary.

ROY N. ANDERSON
Teachers College
Columbia University

PREDICTING ABOUT FRESHMEN

An Attempt to Predict the Success of University Freshmen in Their Adjustment to Scholastic Work. By Omar C. Held. Ann Arbor, Michigan, Edwards Brothers, Inc., 1933. Pp. 50.

Freshmen entering the five undergraduate schools of the University of Pittsburgh in September, 1928, were tested and studied to determine the predictive value for college success of a great variety of preadmission factors.

The results indicate that the Composite Placement test score is the best single preadmission factor for predicting general academic achievement in the freshman year of college. The range of correlation of this score with average grades in freshman subjects was from .45 to .56. This is almost as high as the correlation between the grades of the same studies in the freshman and the sophomore years. Says the author, who is Personnel Assistant to the Dean: "No one seems to have seriously ques-

tioned college teacher's grades as a basis for promotion. It would then seem that the Composite Placement test should be given a place of equal dignity with teacher's marks."

The bulk of the volume is devoted to a detailed report of the interrelationship between tests and various measures of achievement in college. The author has presented his data in sufficient detail to make the publication of great value to anyone else working on the same problem.

Those whose interest in the subject is general rather than specific and who prefer to be spared statistical details will enjoy the three pages devoted to a summary of general conclusions. One can fancy the early opponents of education for women rolling over in their graves at the discovery that the freshman women had a higher average of general achievement than the men of their class. And we find ourselves in cordial agreement with the following opinion of Dr. Held: "If placement officers are correct in their judgment that it is becoming increasingly more difficult to place students who rate below "B" in scholarship and if a student's chances of attaining a "B" average are so slight when he rates below the fiftieth percentile on various preadmission tests should university admission officers admit such students? If these students are admitted the university should set up a curriculum suited to their needs so that when their course of study is completed their placement will be more certain."

R. H.

RADIO IN THE SCHOOLS

School Broadcasting. International Institute of Intellectual Cooperation, League of Nations, Geneva. Boston, World Peace Foundation, 1933. Pp. 210. Price, $2.00.

This book is the outgrowth of an inquiry undertaken by the International Institute of Intellectual Cooperation of the League of Nations. The object was to discover the status of school broadcasting in various countries, the major problems involved, and the lessons thus far learned through experience.

Reports are presented from 25 countries, most of which report no systematic broadcasting in schools, but much desultory effort. In Germany more than one-third of the 55,000 schools used this medium in 1931.

In answer to the questionaire sent them, educators in the various countries formulated certain principles regarding the place of broadcasting in schools, which may be briefly summarized as follows. At its best, the radio should be regarded only as subsidiary to classroom instruction. Its best service is that of illustration and enrichment. In order that a broadcast may attain its maximum effectiveness, the teacher should direct the pupils in preparing for it and in receiving and utilizing the materials. Broadcasting should appeal primarily to the imagination. Periods should be short, not exceeding 30 minutes at a maximum. In general, radio lessons are more effective with pupils over 12 years of age. The radio is particularly serviceable in rural schools.

The subjects deemed most adaptable to broadcasting are music, literature, modern languages, history, geography, history of art, natural sciences and hygiene, elementary anatomy and physiology, ethics and citizenship, technical and vocational guidance.

As might be expected, broadcasting in the field of vocational guidance consists chiefly of lectures on various occupations, particularly in fields of scientific endeavor (Great Britain) and opportunities in

government service (France). Sweden has a series on occupational problems in general. Similar activities in the United States are well described.

Altogether the report shows that a number of valuable projects are being carried out in various countries. The chief obstacles to the establishment of wholesale programs serving all the schools of a nation are the expense of providing enough receiving equipment and the selection of hours that will fit into the time schedules.

HARRY D. KITSON

Teachers College
Columbia University

Abstracts of Doctors' Theses in Education at the University of California. By Arnold E. Joyal. Berkeley, Calif., Lambda Chapter, Phi Delta Kappa, 1933. Pp. 104. Price, $0.25.

All doctors' theses in education from 1898 to March 1933 are abstracted. Only two are indexed under vocational guidance. They are: "The present status of certain beliefs related to public school vocational guidance programs and activities," and "Vocations of the visually handicapped: a study of the need of vocational guidance in residential schools for the blind." Many of the other studies will interest vocational guidance workers.

Success and Failure in the Teaching Profession. By Gladys Hipple Watson. New York, Department of Psychology, Teachers College, Columbia University, 1932. Pp. 99. Price, $0.75.

Thirty-nine graduate students at Teachers College, Columbia University, were selected because a majority of the professors in their major department had predicted outstanding success for them; nineteen were chosen because failure was predicted; the two groups were compared on personal history, interests, reactions to various teaching situations, liberal mindedness, personality, general information, academic success, and intelligence.

Correlations were obtained by use of the bi-serial *r*. The highest correlation was between success and grades obtained in college courses; the next highest, between success and intelligence; the lowest correlation was with the personality factors.

An item analysis of the various tests suggested 25 factors on which the two groups appear to differ.

The Psychology of Pleasantness and Unpleasantness. By J. G. Beebe-Center. New York, D. Van Nostrand Company, Inc., 1933. Pp. 427. Price, $3.75.

After defining pleasantness and unpleasantness as opposite aspects of a single variable which he calls "hedonic tone," Beebe-Center presents an extensive critical review of experiments upon the relation of this variable to numerous other factors. Practical applications are not attempted except in rare cases. Of interest to counselors is the discovery that liking and disliking colors can be reversed in 94 per cent of the cases if the observer undertakes to effect a reversal. Such experiments suggest the intriguing possibility that liking or disliking for jobs may also be amenable to autosuggestion.

The Performance of Student Nurses on Tests of Intelligence **(New Series, Bulletin II).** By Elsie O. Bregman. New York, Teachers College, Columbia University, 1933. Pp. 32. Price, $0.60.

Here are the results of testing 10,000 students of nursing in attendance at 57 accredited schools of nursing throughout the United States. Students in training schools which admit only high school

graduates were found to be in general equal to or slightly superior to high school seniors. Although fewer individuals from the lower half of the high school group are found in nursing schools, the whole range of fourth-year high school ability is represented. The distribution of mental ability among student nurses resembles that found among students at normal schools. It is in general not so high as the ability of students at liberal arts colleges, although the range is approximately the same.

Three Hundred Careers for Women. Compiled by Vyrnwy Biscoe. London, Lovat Dickson, Ltd., 1932. Pp. 227. Price 2/6.

For American readers, there is a tang and flavor about the diction of this book. Cat-breeding, kennel-maid, herbalist, itinerant trading, motherscraft, overseas work and sweet-making are among the terms which startle and intrigue.

The volume is brusque and terse in style, comparable to the American job-dictionary, *The Book of Opportunities,* in method of treatment. Each vocation or vocation-group is given but a few lines as to age, cost of training, qualifications, entrance procedure, recognized bodies, scholarships, prospects, remunerations, and publications, with nothing of description, social evaluation, advantages and disadvantages, and other pertinent items.

The Nations at Work. By Leonard O. Packard, Charles P. Sinnott, and Bruce Overton. New York, Macmillan Company, 1933.

This is not a book on occupational information, though it bears many implications. It is really a textbook on geography and its interest and viewpoint is in the soil, the mills, and the processes, rather than in the workers.

They Write For Us

MORRIS S. VITELES ("Analysis of Occupations: Editorial Foreword") is Assistant Professor of Psychology at the University of Pennsylvania and Director of the Vocational Guidance Clinic which forms part of the Psychological Clinic at the University. Professor Viteles has done considerable research work in industry and is the author of *Industrial Psychology* and *The Science of Work* as well as of numerous articles in the field of industrial psychology and vocational guidance. He is a member of the Technical Committee of NOC.

CLEO MURTLAND ("Occupational Studies") is Associate Professor of Vocational Education and Guidance at the University of Michigan and Chairman of the Occupation Research Section of NVGA.

C. A. KOEPKE ("A Job Analysis Survey") is Associate Professor of Industrial Engineering at the University of Minnesota and author of the recently published Bulletin on the Job Analysis Survey of the Employment Stabilization Research Institute.

LILLIAN M. GILBRETH ("Time and Motion Study") is President of Gilbreth, Inc., consulting engineers in management, and has been a pioneer in the field of motion study. She has published numerous books and papers on education, management, psychology, and the re-education of crippled soldiers, including *Psychology of Management, Time Study, Fatigue Study,* and *Applied Motion Study.*

MILDRED FAIRCHILD ("The Analysis of Skill") is Associate Professor Elect in the Graduate Department of Social Economy and Social Research at Bryn Mawr College. Her special field of study has been in industrial relations and labor problems. She has given considerable attention to the study of unemployment, and one of her most recent publications was *Employment and Unemployment in Pre-War and Soviet Russia.*

E. J. SPARLING ("Intelligence and Occupational Adjustment") is Educational Director of Christodora House, a New York institution well-known to social workers. Dr. Sparling's interest in counseling and research in college guidance and personnel has resulted in the publication of *Do College Students Choose Vocations Wisely?* and *A Rapid Method of Calculating E.Q.'s, I.Q.'s, and A.Q.'s.*

JAY L. OTIS and KINSLEY R. SMITH ("The Job Psychograph in Job Analysis") are instructors in the Department of Psychology at the University of Pennsylvania. They are both engaged in research in the fields of industrial psychology and vocational guidance at the Psychological Laboratory and Clinic.

MARY BOOLE STOTT ("Occupational Analysis for Vocational Guidance") received her training in the fields of psychology and social studies before joining, in 1925, the Vocational Guidance Staff of the National Institute of Industrial Psychology, London. M. BIRKINSHAW, who collaborated with her on this article, is engaged on the same staff.

RICHARD STEPHEN UHRBROCK ("Job Analysis in Industry") is head of the Research Department, Industrial Relations Division, The Procter & Gamble Company. His career has included personnel work in the Western Union Telegraph Company and teaching at Cornell University. He has developed the use of psychological methods in improving selection and training procedures in industrial situations, and has worked on job analyses, evaluation of attitudes, and planning training programs. He is the author of many books and periodical articles on these subjects, including *Job Analysis and the Curriculum* (with E. K. Strong, Jr.) and *Analysis of the Downey Will-Temperament Tests.*

W. W. CHARTERS ("Classifying Occupations for Instructional Purposes") is Director of the Bureau of Educational Research at Ohio State University. Dr. Charters' development of the thesis that all instruction should be organized around function and structure, and around individual needs and means of satisfying them, makes him one of the leading figures in the educational world. He has written *Methods of Teaching, Teaching the Common Branches, Curriculum Construction,* and *The Teaching of Ideals.*

FRANZISKA BAUMGARTEN ("New Aspects of Job Analysis") is Docent at the University of Bern, Switzerland. She has done considerable research work in the field of vocational psychology in Germany and Poland as well as in Switzerland. She is the author of a comprehensive text on aptitude testing, *Die Berufseignungsprüfungen,* as well as of many other publications on job analysis, vocational selection, and related subjects.

SPECIAL ISSUES—SPECIAL RATES

Professors of psychology, education, guidance, and personnel administration may wish to place several copies of this symposium on the reserve shelves of their university libraries. Special quantity rates have been provided as follows:

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50 or more copies at 30 cents each.

The same rates apply to the April issue of the magazine, devoted to a symposium on "Analysis of the Individual."

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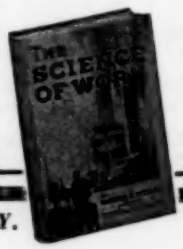

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THE PURPOSES AND ACTIVITIES OF THE NATIONAL OCCUPATIONAL CONFERENCE

The National Occupational Conference is interested in all aspects of occupational adjustment, and in cooperative efforts to study this problem. At present it is concerned primarily with assembling information about occupations, and making such information available to the public through effective publication. It seeks to encourage research in fields where adequate information is not available at present, and maintains at headquarters an index of published information on all occupations.

The Conference also provides, for educational institutions, libraries, and other interested organizations, a consulting service regarding the theory and practice of vocational guidance, and the results of research in occupational adjustment. No charge is made for any assistance which can be given by mail. Upon request, a staff officer of the Conference will visit local institutions for consultation regarding the organization of work designed to contribute to the better occupational adjustment of more than one person. The Conference will contribute the services of staff officers for such trips, but will expect local institutions to defray the necessary expenses. The work of the Conference does not include counseling with individuals regarding their personal occupational problems.

The National Occupational Conference is administered through the American Association for Adult Education.

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The Vocational Guidance Magazine, for eighteen years the official organ of the National Vocational Guidance Association, has taken one more forward step in its steady development and appears now in enlarged size under the name: *Occupations, the Vocational Guidance Magazine.* It continues its official relation to the National Association and at the same time becomes the medium for disseminating guidance and occupational information resulting from the work of the National Occupational Conference.

This periodical is to contain ninety-six pages, adequately illustrated, and issued nine times a year, October to June. The subject matter is designed to appeal to those interested in all phases of guidance in school, industry, business, social agencies, and service clubs. Occupational adjustment of both youth and adult will be presented through articles specially prepared by outstanding persons.

FRED C. SMITH, EDITOR
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